



LIBERIANS
FEED
YOURSELVES
AGENDA

NATIONAL AGRICULTURE DEVELOPMENT
PLAN 2024-2030



HIS EXCELLENCY
JOSEPH NYUMA BOAKAI, Sr.
PRESIDENT OF THE REPUBLIC OF LIBERIA

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Statement from the President of the Republic

Embracing the LIBERIANS FEED YOURSELVES AGENDA

My dear citizens of Liberia,

My dear technical and financial partners,

When asked about Liberia, anyone who has lived, visited, or worked here will describe it as a loving and hospitable country, naturally beautiful and scenic, rich in natural resources, and home to determined and resilient people.

We have an attractive agricultural environment that provides opportunities for national food self-sufficiency and wealth creation. Sixty Five percent (65%) of our working population is under 25 years of age, providing a youthful and eager workforce for the sector. The sector contributes over \$1.3 billion to our economy and creates job opportunities for over 60% of our workforce. With over 4 million acres of arable land and 4,320 mm of average annual rainfall, we have the potential to feed our population and export agricultural products.

Liberia also has immense forest reserves, making it a carbon sink for the world. Our natural capital is worth \$24.7 billion, including \$1,035 per capita in forest capital.

In addition to its natural endowment, Liberia is also strategically located on the west coast of Africa, providing access to major international markets. We have formed international trade relationships, granting preferential access and opportunities for export.

Despite these strengths, we still import 70% of the rice we consume, diverting scarce foreign exchange resources away from essential infrastructure and human development projects. Liberia should no longer spend millions of dollars on food imports.

To address this issue, we are launching the LIBERIANS FEED YOURSELVES AGENDA, a comprehensive six-year National Agriculture Development Plan (NADP) 2024-2030 intended to revitalize our agricultural sector, put it at the forefront of our economy, and enhance our self-sufficiency in food production.

In the face of global climate change and economic crises, ensuring food security is paramount. The NADP is designed to be a game changer, leveraging inventive strategies, modern technologies, and comprehensive investments to build a more secure and sustainable future.

Beyond food sovereignty, this initiative is a human dignity issue, a commitment to building an economic, social, and just future for our youth and women who are the very essence of our nation.

By launching the LIBERIANS FEED YOURSELVES AGENDA, we express our political will to transform our agricultural landscape. We are committed to harnessing every potential in the sector to bring progress and development to our people.

This initiative is designed to support and empower farmers to increase productivity and efficiency through strategic investments in agricultural infrastructure, technology, and research. We will train farmers in modern agricultural technologies and empower them with resources to undertake large-scale cooperative farms.

We are calling on all Liberians, especially key stakeholders in the agricultural sector, to join us on this journey. Your participation is crucial; your technological know-how is vital; your investment funds are indispensable; and your wholesale commitment is critical for us to meet these targets.

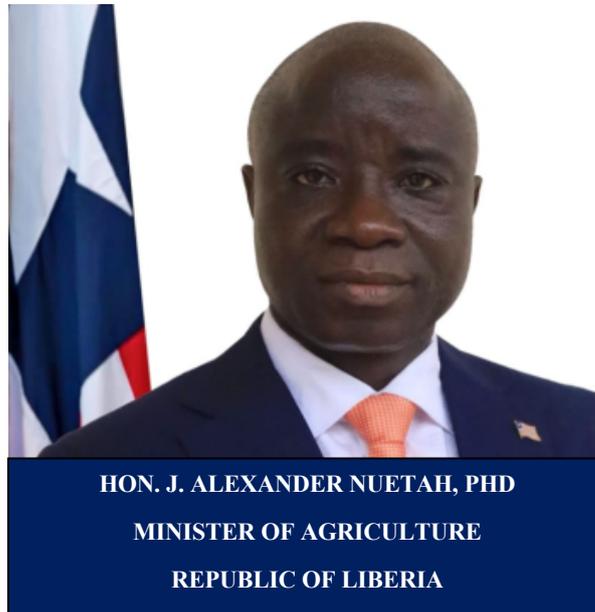
Together, we can build a more resilient and self-reliant agricultural sector. When agriculture flourishes in Liberia, the entire Liberian nation flourishes. No one goes to bed on an empty stomach; no child is malnourished; no child goes to school hungry; more jobs are created; poverty diminishes, crime goes down, peace reigns; the Lone Star shines, and we all celebrate the joy and happiness in the bright shining Lone Star.

Dear technical and financial partners, this is a call for your support of our political will, commitment, and investment in the NADP. Let us all embrace the call to revolutionize our agriculture and live it. Let us together THINK LIBERIA, LOVE LIBERIA, AND BUILD LIBERIA!

Thank you.

Joseph Nyuma Boakai, Sr.
PRESIDENT
REPUBLIC OF LIBERIA

Statement from the Minister of Agriculture



Dear Citizens,

I am honoured to lead the Ministry of Agriculture in crafting a comprehensive plan to transform Liberia's agricultural sector into a thriving industry, driving national economic growth and ensuring food security for our people. The LIBERIANS FEED YOURSELVES AGENDA dubbed the National Agriculture Development Plan (NADP) 2024-2030 is our six-year policy initiative that leverages technology and a cooperative approach to empowering farmers and increasing agricultural productivity.

The NADP is designed to make agriculture robust and attractive, using it as an accelerator of growth to provide the nutritional needs of our people, create jobs, and generate foreign revenue from exports. We will focus on developing the value chains of targeted agricultural commodities, including food crops, cash crops, fruits, livestock, and fisheries and aquaculture. The LIBERIANS FEED YOURSELVES AGENDA is intended to lay the foundation for rapid agriculture development using the comparative advantages of each of our counties to develop value chains that economically empower our people in those counties.

The plan considers the constraints that affect our farmers and other value-chain actors including low productivity, poor rural infrastructure that limits access to market, limited access to improved production techniques and postharvest-handling technologies do not only lead to negative climate-change effects but also high postharvest losses, and lack access to affordable credit for value-chain development. As a result, the NADP will require massive investment that enable our farmers engage in climate-smart agricultural practices, have access to improved technologies that enhance productivity and reduce postharvest losses, adopt nutrition-sensitive agriculture that ensures improved food quality and food safety, supporting rural infrastructure development to strengthen market-access linkages and take us closer to food self-sufficiency, particularly in rice and fish production, and promote agro-enterprise development by ensuring

the establishment an Agriculture Enterprise Development Bank that provide access to finance for agriculture value-chain actors.

The estimated cost of the required investment for this plan is put at over USD717 million, which will be used to create mechanization hubs across the country to handle production and post-harvest challenges, strengthen agricultural research, build the capacity of agriculture extension technicians and strengthen the institutional capacity of the Ministry of Agriculture', and enhance access to finance for actors in agriculture value chains.

The NADP is a vision for the future that every Liberian should embrace. Liberia, with large tracts of arable land across the country and a 579 km coastline rich in demersal and pelagic fisheries resources, it is heartbreaking to know that more than two million Liberians are today food insecure and suffering from undernourishment. This is why, as the head of the sector overseeing the President's mandate to "make agriculture work for our people", I pledge to firmly work with all stakeholders—our development partners, private-sector actors, cabinet colleagues, and our farmers, ensuring no stone is left unturned, to mobilize the resources needed for the full implementation of this plan in our pursuit of a more prosperous Liberia.

We will also mobilize the support of relevant government Ministries, Agencies and Commissions, the private sector, development partners, and other critical stakeholders in the implementation and monitoring of this NADP. We will ensure the required publicity created to effectively communicate and sell this initiative to the Liberian people, especially the key stakeholders that will make this plan work and create the desired impact on our people's lives. We will need the support and collaboration of the Liberian media in this direction. This synergy holds the key to superior execution of the NADP in line with the ARREST agenda, the national aspiration to fast-track inclusive growth and development.

Your support in this endeavor is not just valuable, it is crucial. Together, we can rewrite Liberia's narrative. We can create a new Liberia where food is abundant, where everyone has access to nutritious meals, and where our farmers thrive. This is our opportunity to make a real difference in the lives of our fellow citizens. Let's seize it together.

Sincerely,

Dr. J. Alexander Nuetah
MINISTER OF AGRICULTURE
REPUBLIC OF LIBERIA

ACKNOWLEDGEMENTS

The Ministry of Agriculture of the Republic of Liberia expresses its sincere gratitude and appreciation to the various stakeholders and institutions who contributed to the articulation and development of the LIBERIANS FEED YOURSELVES AGENDA, our National Agriculture Development Plan (NADP) 2024-2030.

This document benefited immensely from the technical contributions and support of the Food and Agriculture Organization (FAO) of the United Nations. The FAO delivered on time and worked methodically with staff from the Central Agriculture Research (CARI), the University of Liberia (UL) and the Ministry of Agriculture to enhance their capacity in developing an agricultural investment plan based on the targeted agriculture value chains.

Equally worth mentioning are the logistical contributions of the World Food Program (WFP), the International Fund for Agricultural Development (IFAD), the World Bank, and the United States Agency for International Development (USAID).

The Ministry of Agriculture would like to extend a special appreciation to the Ministries of Finance and Development Planning, Commerce and Industry, the National Investment Commission, the Environmental Protection Agency, Liberia Institute for Statistics and Geo-Information Service, National Land Authority, Cooperative Development Agency, National Aquaculture and Fisheries Authority, Liberia Agricultural Commodity and Regulatory Authority, and the Forestry Development Authority for their participation in the technical validation exercises that produced the final version of this document. Additionally, the Ministry acknowledges the valuable contributions of farmer organizations, the private sector and other key stakeholders in approving this plan at a validation workshop held in May 2024, which will guide the implementation of programs and projects to ensure food security, employment generation, and wealth creation in Liberia.

The Ministry of Agriculture of the Republic of Liberia
EJS Complex
Monrovia
July 2024

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ACRONYMS AND ABBREVIATIONS

| | |
|--------|--|
| AEDB | Agriculture Enterprise Development Bank |
| ARREST | Agriculture Roads Rule of Law Education and Tourism |
| CARI | Central Agricultural Research Institute |
| ECOWAP | Economic Community of West Africa Agricultural Policy |
| ECOWAS | Economic Community of West African States |
| FAO | Food and Agriculture Organization of the United Nations |
| GDP | gross domestic product |
| HACCP | Hazard Analysis and Critical Control Points |
| HICP | Harmonized Index of Consumer Prices |
| LACRA | Liberia Agriculture Commercialization Regulatory Authority |
| LASIP | Liberia Agriculture Sector Investment Plan |
| MOCI | Ministry of Commerce and Industry |
| NADA | National Agriculture Development Agenda |
| NADP | National Agriculture Development Plan |
| NASC | National Agriculture Steering Committee |
| NDC | Nationally Determined Contribution |
| NICC | National Implementation Coordination Committee |
| SDG | Sustainable Development Goal |
| SME | Small and Medium Enterprise |
| TQM | Total Quality Management |
| UNDP | United Nations Development Program |
| UNFPA | United Nations Population Fund |
| UNICEF | United Nations International Children's Education Fund |
| USAID | United States Agency for International Development |
| USD | United States dollar |
| WFP | World Food Program |

**Vision**

A resilient, sustainable, and technology-driven Liberian agricultural sector that empowers smallholder farmers for wealth creation, ensures food security and drives inclusive economic growth.

Mission

Provide leadership and coordination in the development of Liberian agricultural value chains to promote food and nutrition security and contribute to the socio-economic development of Liberia.

Mandate

Develop Liberia's agri-food systems, including crops, livestock, and fisheries, for improved production, inclusive agribusiness and market access, youth employment and women's empowerment.

I. EXECUTIVE SUMMARY

Background: This *LIBERIANS FEED YOURSELVES AGENDA* is the country's National Agriculture Development Plan (NADP), covering the period 2024–2030, and provides the path for national food self-sufficiency and indigenous wealth creation through agricultural value chain development. It covers the agricultural and rural sectors in Liberia and aligns with existing national policies and strategies such as the National Agriculture Development Agenda 2024–2029, the Liberia National Rice Development Strategy II 2018–2030, and the Liberia National Climate Adaptation Plan 2020–2030.

The NADP is the country's agriculture development program set for the period 2024–2030 and prepared by the Ministry of Agriculture, in collaboration with stakeholders and development partners, to enable the country to fully utilize its agricultural development potential, considering current climatic variability and predictable climate change scenarios for Liberia. The NADP 2024–2030 integrates climate change resilience pathways proposed by the Liberia Technology Needs Assessment Report for adaptation in the agriculture and fisheries sectors (Kannah, 2019).

The NADP proposes sustainable strategies to promote the growth of productivity and the reduction of food loss in the agriculture and fisheries sectors through a value chain approach. It focuses on key value chains, among others, related to their expected impacts on climate change adaptation, food and nutritional security, poverty reduction, inclusive social protection measures, youth employment and women's empowerment.

This document introduces and summarizes the detailed value chain programs annexed to it, covering the:

- food crops value chain (rice, cassava, maize, vegetables);
- cash crop value chain (rubber, cocoa, coffee, cashews and coconuts);
- fruit crop value chain (avocados, citrus, mangoes, bananas and papayas);
- livestock value chain (poultry, cattle, goats, sheep, pigs); and
- fisheries and aquaculture value chain (support to inland fisheries).

The development of these value chains will be supported by cross-cutting investments that address common cross-cutting issues, such as:

- mechanization, with a focus on the creation of mechanization hubs in production clusters for both production and post-harvest handling;
- strengthening agricultural research and extension capacities to promote innovative technical approaches;
- developing inclusive agribusiness models for the integration of smallholders into agrifood value chains;
- leveraging technology and digitization for agricultural productivity, including through the development of farmer registries to enhance access to rural productivity services and social protection schemes;
- access to finance through the establishment of the agriculture enterprise development bank and financial inclusion for smallholder farmers; and

- strengthening the capacity of the Ministry of Agriculture.

The total cost of the investment to support the implementation of the NADP over the next five to six years (2024–2030) has been estimated at USD 717 760 978, broken down as follows in Table 1.

TABLE 1: PROJECTED COST OF THE NADP OVER THE PERIOD 2024–2030

| VALUE CHAIN PROGRAM | COSTS (USD) | % |
|----------------------------------|--------------------|--------------|
| Food crops | | |
| Rice | 178 255 000 | 24.83% |
| Cassava | 27 230 000 | 3.79% |
| Maize | 18 050 500 | 2.51% |
| Vegetables | 32 000 000 | 4.46% |
| Cash crops | | |
| Cocoa | 31 275 000 | 4.36% |
| Coffee | 32 606 890 | 4.54% |
| Coconuts | 30 250 700 | 4.21% |
| Cashews | 28 879 000 | 4.02% |
| Rubber | 52 500 000 | 7.31% |
| Fruit crops | | |
| Avocados | 26 669 500 | 3.72% |
| Citrus | 22 000 000 | 3.07% |
| Mangoes | 18 570 000 | 2.59% |
| Papayas (pawpaws) | 17 890 000 | 2.49% |
| Bananas | 31 216 250 | 4.35% |
| Livestock | | |
| Cattle | 45 999 240 | 6.41% |
| Sheep and goats | 865 000 | 0.12% |
| Poultry | 1 587 450 | 0.22% |
| Pigs | 872 448 | 0.12% |
| Fisheries and aquaculture | 12 273 713 | 1.71% |
| Cross-cutting programs | | |

| | | |
|---|--------------------|----------------|
| Creation of mechanization hubs in major production clusters for both production and post-harvest handling | 25 525 000 | 3.56% |
| Strengthening agricultural research and extension capacities to promote innovative technical approaches | 28 830 000 | 4.02% |
| Strengthening the capacity of the Ministry of Agriculture | 8 785 000 | 1.22% |
| Developing inclusive agribusiness models for the integration of smallholders into agrifood value chains | 4 500 000 | 0.63% |
| Establishment and capitalization of the agriculture enterprise development bank | 40 300 000 | 5.61% |
| Communication strategy | 839 000 | 0.12% |
| Total investment cost | 717 760 978 | 100.00% |

The details of the NADP's costs per specific value chain program by component and per year are given in the appendix in the various value chain programs.

The NADP expected results are:

TABLE 2: EXPECTED RESULTS FOR THE VARIOUS VALUE CHAIN PROGRAMS

| Value chain | Expected results |
|--------------------|--|
| Food crops | |
| Rice | <ul style="list-style-type: none"> - 50 000 ha of lowland for irrigated rice production developed over five years - Appropriate business environment created to attract private-sector involvement in large-scale commercial rice production and processing in five major rice production clusters - Rice production units (cooperatives) established in five major rice production clusters - Post-harvest management facilities (rice mills, warehouses) constructed in five major rice production clusters to facilitate post-harvest handling - National rice self-sufficiency achieved by 70 percent over five years - Rice importation reduced by 70 percent over five years |

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| | <ul style="list-style-type: none"> - Post-harvest losses decreased by 15 percent within two years of NADP implementation - Rice farmers' incomes enhanced by 30 percent over the next five years |
| Cassava | <ul style="list-style-type: none"> - 20 000 ha of secondary forestland under mechanized cassava cultivation developed over five years - 500 cassava production units (cooperatives) with 20 members each cultivating 2 ha (5 acres) established in six designated counties - Appropriate business environment created to attract private-sector investment in large-scale commercial cassava production and value addition in six major production counties - Creation of aggregation units facilitated to link fresh cassava root producers to processors - Cassava cutting multiplication sites (10 ha each) established in six major cassava-producing counties of Liberia - Cassava yield increased by a minimum 20 t/ha |
| Maize | <ul style="list-style-type: none"> - 20 000 ha of secondary forestland under mechanized maize production developed over five years - 500 maize production units (cooperatives) with 20 members each cultivating 2 ha (5 acres) established in six designated counties - Appropriate business environment created to attract private-sector investment in large-scale commercial maize production and animal feed processing to support poultry and fish production - Maize production grown by more than 100 percent annually over the first two years - Access to maize post-harvest management technology increased and post-harvest losses reduced by 10 percent annually over five years - Access to affordable maize for animal feed production increased by 75 percent in first two years - Adoption of on-farm feed production increased by 30 percent in five years |
| Vegetables | <ul style="list-style-type: none"> - 2 000 ha of farmland developed and outfitted with irrigation system over five years to support vegetable production (500 ha each for tomatoes, peppers, beans and groundnuts) |

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| | <ul style="list-style-type: none"> - 10 greenhouses constructed on designated community colleges and university farms for the cultivation of high-value vegetables (cabbage, lettuce, collards, carrots, onions, tomatoes and watermelon) - Vegetable markets standardized and equipped with standard units of measurement - Post-harvest management equipment and facilities provided in major vegetable production and trading corridors, and post-harvest losses of vegetables reduced by 50 percent - National vegetable availability and affordability enhanced and consumption increased due to higher yield |
| Cash crops | |
| Cocoa | <ul style="list-style-type: none"> - 25 000 ha of new cocoa farms established in five cocoa-producing counties over five years - National cocoa gardens established in five cocoa-producing counties to provide improved planting materials for cocoa farmers - Cocoa nurseries established in major cocoa production districts in designated cocoa production counties to produce seedling for smallholder farmers - National cocoa research institute established at CARI to support cocoa value chain development - National cocoa board established to provide guidance for development of the value chain |
| Coffee | <ul style="list-style-type: none"> - Coffee subsector revived and appropriate programs developed to sustain activities in the subsector - 15 000 ha of new smallholder coffee farms developed over five years through tailored programs - National coffee (Liberica) gardens established in five cocoa-producing counties to provide improved planting materials for coffee farmers - Liberica coffee nurseries established in major cocoa production districts in designated cocoa production counties to produce seedling for smallholder farmers - National coffee research institute established at CARI to support coffee value chain development |
| Cashews | <ul style="list-style-type: none"> - 10 000 ha of greenfield cashew plantation developed through smallholder support program - 5 000 cashew farmers, of which 60 percent are youth and women, trained in cashew cultivation |

| | |
|--------------------|---|
| | <ul style="list-style-type: none"> - National cashew production and local value addition expanded through support to private-sector initiative - Cashew research program developed and supported at the Central Agriculture Research Institute (CARI) - National cashew nurseries established in designated cashew production zones to facilitate farmers' access to improved planting material |
| Coconuts | <ul style="list-style-type: none"> - Cultivation of 2 million new coconut trees supported in the southeastern coastal counties of Rivercess, Sinoe, Grand Kru and Mary Land - Private-sector investment facilitated to support the local value addition of coconut and coconut by-products - National coconut research program developed and supported at the Tubman University to develop innovation in the coconut industry - Coconut seedling gardens established in four designated counties through private-sector initiative for the production and distribution of improved varieties of coconut seedlings |
| Rubber | <ul style="list-style-type: none"> - 20 000 ha of new smallholder rubber farms established in the six major rubber-producing counties through the supply of improved and high-yielding clones - 10 000 ha of existing farms rehabilitated in six rubber-producing counties - National rubber research institute established under the Rubber Development Fund, Inc (RDFI) to stimulate innovation development in the rubber industry - Local rubber value addition capacity strengthened through increased access to unprocessed rubber |
| Fruit crops | |
| Papayas | <ul style="list-style-type: none"> - 1 000 ha of improved papaya plantation established through support to smallholder farmers - Institutional capacity of interested private-sector actors strengthened in major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings - Development of local papaya trade facilitated to create offtake opportunities for producers - Access to post-harvest management facilities and technology improved to reduce post-harvest loss |

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| Avocados | <ul style="list-style-type: none"> - 5 000 ha of avocado plantation established through support for smallholder producers - Institutional capacity of interested private-sector actors strengthened in major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings - Development of local avocado trade facilitated to create offtake opportunities for producers - Access to post-harvest management facilities and technology improved to reduce post-harvest loss |
| Mangoes | <ul style="list-style-type: none"> - 1 000 ha of improved mango plantation established through support for smallholder farmers - Institutional capacity of interested private-sector actors strengthened in major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings - Development of local mango trade facilitated to create offtake opportunities for producers - Access to post-harvest management facilities and technology improved to reduce post-harvest loss |
| Citrus | <ul style="list-style-type: none"> - 5 000 ha plantation of smallholder farmers established for the production of improved citrus varieties - Institutional capacity of interested private-sector actors strengthened in major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings - Development of local citrus trade facilitated to create offtake opportunities for producers - Access to post-harvest management facilities and technology improved to reduce post-harvest loss |
| Bananas | <ul style="list-style-type: none"> - 5 000 ha banana orchard of smallholder or larger-scale farmers developed or established - National research in banana value strengthened for the production of improved banana varieties and post-harvest and value-addition techniques - Joint national plantain and banana steering committee established - Capacity of interested private-sector actors, including smallholder farmers and community members, strengthened - National banana production belt established |

| | |
|----------------------------------|--|
| | <ul style="list-style-type: none"> - Development of local banana trade facilitated to creation of offtake opportunities for producers - Access to post-harvest management facilities and technology improved to reduce post-harvest loss |
| Livestock | |
| Cattle | <ul style="list-style-type: none"> - Seven major cattle production ranches across the country rehabilitated and restocked - National cattle breeding program developed to support expansion of local cattle production - National livestock policy formulated to guide development of the sector - National veterinarian service delivery system strengthened |
| Poultry | <ul style="list-style-type: none"> - Farmer-based organizations in nine counties involving at least 2 800 farmers empowered to engage in modern poultry production practices - Commercial poultry farmers supported to increase poultry production (broilers and layers) for the local market - Private-sector investment facilitated for the establishment of industry for feed production - National self-sufficiency of egg production attained by 2028 and egg importation of egg banned, and poultry meat importation reduced by 75 percent over five years - Private-sector investment facilitated for the establishment of local hatcheries for the production of day-old chicks |
| Sheep and goats | <ul style="list-style-type: none"> - 5,000 heads of goat and 2000 heads of sheep restocked in six counties (Nimba, Lofa, Bong, Grand Cape Mount, Grand Bassa and Bomi) targeting 3,500 farmers - Access to veterinarian service delivery system strengthened |
| Pigs | <ul style="list-style-type: none"> - 500 pig farmers across the country supported to engage in commercial piggery - Pork value-addition agribusinesses supported to formalize pork market - National pig-breeding program established to support development of piggery subsector |
| Fisheries and aquaculture | <ul style="list-style-type: none"> - Number of fish farmers increased by 40 percent annually, from the current figure of 300 farmers to 1 050 farmers or more during the program phase |

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|--------------------------------|--|
| | <ul style="list-style-type: none"> - Volume of marine fisheries production increased by 40 percent, from approximately 28 000 t to 35 200 t - Number of fishponds increased from 1 704 to 2 907, while size increased from 160 ha to 274 ha - Number of fish products labelled and certified to meet export standard increased by 40 percent - Percentage of post-harvest loss reduced from 40 percent to 10 percent - Number of fishers increased from 13 000 to 18 200 - Number of fish processors increased from 18 000 to 25 200 |
| Cross-cutting programs | |
| Mechanization | <ul style="list-style-type: none"> - Eight mechanization hubs equipped with machinery and equipment (such as tractors, harvesters, threshers, sorting and grading machines and packaging equipment) along with workshop and maintenance center constructed in five major producing counties - Training and capacity building in machinery operation and maintenance provided for a target group of youth in hub communities - Farmers' access to equipment for farm mechanization services enhanced - Eight private-sector actors recruited and empowered to operate and manage machineries for service provision to local farming communities |
| Research and extension support | <ul style="list-style-type: none"> - CARI is decentralized in specialized sub-research centers and extension offices in key agricultural districts constructed to facilitate research and technology dissemination - Capacity of the Department of Regional Development, Research and Extension of the Ministry of Agriculture strengthened to provide effective agricultural extension and advisory services - Collaboration among public and private stakeholders in agricultural research and extension activities strengthened to expand extension service delivery to rural farmers - Improved crop varieties, pest management strategies and sustainable farming practices developed and disseminated - Capacities of farmers to adopt innovative technologies and practices through tailored extension services enhanced |

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| | <ul style="list-style-type: none"> - Increased productivity, resilience and sustainability of the agriculture sector and sector workers, in particular women, leading to improved food security and livelihoods - Extension services, including farmer field schools and Dimitra Clubs, established and strengthened - National fund for agricultural and agrifood research studied for implementation |
| Strengthening capacity of the Ministry of Agriculture | <ul style="list-style-type: none"> - Skills and knowledge of 96 staff members comprising 60 regional agriculture specialists enhanced in specialized fields in agriculture - Appropriate logistics and office equipment provided to facilitate efficient management of the agriculture sector - Ministry of Agriculture Project Management Unit capacities enhanced in monitoring and evaluation - Collaboration with stakeholders on program implementation strengthened |
| Developing inclusive agribusiness models for the integration of smallholders into agrifood value chains and farmer registries to enhance access to services and social protection | <ul style="list-style-type: none"> - Support provided for 2000 young people and women in 200 microenterprises involved in the manufacture of organic fertilizers and biopesticides - Support provided for the creation of 950 microenterprises covering 9500 young people and women. - Support provided for the establishment of integrated market gardening/fruit-growing perimeters by supplying farming equipment (tractors, storage warehouses, air dryers, inputs). - Support provided for setting up 50 local packing houses and 50 youth processing microenterprises to process and distribute cereal and vegetable products through the development of local packaging and processing capacity to extend storage life and manage seasonal oversupply. - Support provided for the setting up of improved collective and family poultry production units with 10,000 young people and women supported in setting up improved collective and family poultry production units and 300 associate professionals trained in poultry farm management. - Improvement in women's and young people's employability in the conservation, processing and marketing of fishery and aquaculture products, as planned in the fisheries value chain - Building of capacity in financial literacy for women youth engaged in agriculture value chain development |

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| | <ul style="list-style-type: none"> - Support strengthened for homegrown school feeding, linking small-scale producers to schools for access to healthy dietary meals |
| Establishment of the Agriculture Enterprise Development Bank to strengthen access to finance for agriculture value-chain actors | <ul style="list-style-type: none"> - Feasibility study for the establishment of an Agriculture Enterprise Development Bank completed to enable the government make necessary decisions - Estimated investment of USD 40 million raised for the capitalization of Agriculture Enterprise Development Bank under a public-private partnership |

The return on investment of the NADP amounts to 0.97 percent, generating a gross profit totalling USD 1 325 624 071 (Table 3). The total income projected for the period (2024–2029) stands at USD 1 997 746 049 (Table 3).

TABLE 3: PROJECTED INCOME PER VALUE CHAIN, USD

| Value chain | Investment estimates | Income projection |
|---|----------------------|-------------------|
| Cattle | 45 999 240 | 5 562 950 |
| Goats and sheep | 865 000 | 504 000 |
| Poultry | 1 587 450 | 512 550 |
| Pigs | 872 448 | 2 455 875 |
| Cash crops | 175 511 590 | 361 784 484.10 |
| Fruit crops | 116 345 750 | 1 118 791 550 |
| Food crops | 255 535 500 | 504 370 000 |
| Fishery | 12 265 000 | 3 764 640 |
| Strengthening capacity of the Ministry of Agriculture | 8 785 000 | |
| Mechanization | 25 525 000 | |
| Research and extension support | 28 830 000 | |
| Grand total | 672 121 978 | 1 997 746 049 |
| Gross profit | 1 325 624 071 | |
| Return on investment | 0.97% | |

II. CONTEXT

Geography and climate

Liberia lies in the middle of the Upper Guinea Rainforest Region along Africa's western coast. This region, which is among the world most biologically diverse, was once covered by a continuous and dense tropical rainforest ranging from Guinea south through to Ghana (World Bank, 2021a). The climate in Liberia is predominantly equatorial, with three distinct topographical belts (World Bank, 2021a). It is one of the world's wettest countries, with an average annual rainfall exceeding 2 500 mm (World Bank, 2021b). The average rainfall, which is highest near the ocean, decreases towards the interior plateaus and low mountains, where it drops to roughly 2 030 mm (World Bank, 2021b).

Climate change: The projected climate in Liberia from 2010 to 2050, based on an ensemble of regional climate models, presents a scenario that will exacerbate the already-reduced productivity of agriculture, forestry, fisheries and water resources. These sectors have experienced severe impacts from climate change in recent decades, negatively affecting developmental growth and leading to the degradation of the human and physical environment.

Climate change-induced changes in rainfall patterns have disrupted the agricultural system. The temperature has had direct consequences for the country, given that more than 60 percent of the population engages in agriculture as their main livelihood activity (World Bank, 2023), with the nation's staple, rice, covering most of the area under production and rubber and cassava coming in second and third, respectively.

Economic and social overview

The economy of Liberia expanded by 4.7 percent in 2023, according to the World Bank (2024). Growth in the primary sector was a sluggish 1.4 percent, as the output of rubber, crude palm oil and other key agricultural products declined throughout the year (World Bank, 2024). On the other hand, output in the secondary sector expanded by 13.9 percent in 2023, led by mining (and by increased gold production in particular) (World Bank, 2024). Growth in services increased from 2.8 percent in 2022 to 3.8 percent in 2023 (World Bank, 2024). Overall, the country's medium-term growth prospects are positive, with the economy expected to expand by 5.3 percent in 2024 and an average of 5.9 percent in 2024 through 2026 (World Bank, 2024).

More than half of poor Liberians depend primarily on agriculture for their livelihoods, so the success of the sector is instrumental for sustainable poverty reduction (World Bank, 2023). Many farming households grow food, particularly rice, for themselves, with few engaging in cash crops (World Bank, 2023). Increased crop production, especially rice and cassava produced primarily for domestic consumption, has been the main driver of growth in the agriculture sector.

Social development

Gender

Women make up 49.6 percent of the population of Liberia (United Nations Liberia, 2023) and constitute more than 60 percent of the agricultural labour force, engaging in such activities as

planting, weeding and harvesting. This makes women essential to the country's development, particularly in rural areas where they play a key role in food production and household food security. Women perform numerous tasks, including fetching wood and water, child care, home maintenance and marketing activities. They dominate various agriculture value chains – especially in food, cash and fruit crops – and contribute significantly to production, processing, product development and marketing. Some women also head their families, taking on additional responsibilities.

Since the end of the civil war in 2003, women's roles have expanded beyond traditional norms, underscoring their importance in food and nutrition security. Yet they still have limited decision-making power in agriculture due to male-dominated structures. Challenges include limited access to technology, improved inputs, credit and markets because of discriminatory cultural practices. Women also are underrepresented in key economic sectors such as timber, mining and rubber. The rigid gender division of labour based on crop cultivation further restricts women – especially in cash crop production, which is typically dominated by men. Female-headed households often struggle to access land, and they also struggle with better wages due to their inability to participate in communal labour. Enhancing women's access to resources, education and decision-making processes is crucial for sustainable agriculture development in Liberia.

Youth

In Liberia, nearly 70 percent of the population is younger than 35, with about 36 percent within the 10–24 age range, making youth a significant demographic group (UNFPA, 2023). This highlights the importance of addressing their needs and challenges – including their limited access to employment, education and health care, which hinders their potential contributions to national development. Despite being a substantial untapped labour resource capable of boosting agricultural production and enhancing food security, many young people are reluctant to engage in farming, as it remains at subsistence level and brings in limited and unpredictable income. Further, the absence of or limited access to basic services and utilities – such as electricity, portable water and the internet – reinforces the drudgery of their environment. Instead, youth often leave rural areas for urban centers such as Monrovia in search of better opportunities and quick incomes. Addressing this will involve several actions, such as strengthening flagship projects and programs in the field of youth employment, promoting a more favourable environment for youth employment, and reviewing and revising policies and strategies that are more focused on young people and that guarantee sustainable investment in the agriculture sector.

Vulnerable people

A significant portion of the population of Liberia is considered vulnerable, largely due to the impacts of the 14-year civil war. Currently, 52.3 percent of the population is classified as multidimensionally poor, with an additional 23.3 percent vulnerable to such poverty (UNDP, 2023). This includes mentally challenged youth (Zogos), households led by elderly members, the chronically ill or disabled, widows, returnees from Ghana, refugees from Côte d'Ivoire, children born out of wedlock or from sexual violence, orphans, and single-parent young

women. Ensuring peace and stability in Liberia requires effective support for these vulnerable groups, focusing on creating sustainable livelihoods and improving access to education, health care and economic opportunities.

Nutrition

Malnutrition remains a significant concern in Liberia, primarily affecting children under 5, pregnant and lactating women, adolescents and individuals with specific health vulnerabilities. This issue can hinder a child’s cognitive development, physical abilities and overall health and well-being. Moreover, it contributes to poverty, food insecurity, poor dietary uptake, low education performance and limited access to basic social services, ultimately affecting productivity, earnings and health outcomes in adulthood.

Globally, in 2022, approximately 149 million children under 5 were estimated to be stunted, while 45 million were wasted and 37 million were overweight or living with obesity (World Health Organization, 2023). Studies indicate that nearly half of deaths among children under 5 are linked to undernutrition (UNICEF, 2023), which predominantly occurs in low- and middle-income countries. The developmental, economic, social and medical impacts of malnutrition are severe and lasting, affecting individuals, families, communities and countries.

Health and nutrition are fundamental rights of children, as enshrined in the 1948 Universal Declaration of Human Rights and the 1946 Constitution of the World Health Organization. The United Nations Convention on the Rights of the Child emphasizes the right to life, health and medical care, as well as the right to a good and adequate standard of living, including food. Liberia also has passed the 2011 Children’s Law of Liberia, which explicitly outlines the rights to access adequate food, safe water, nutrition and health care.

International regional obligations include adherence to the Sustainable Development Goals (SDGs), including SDG 2 and SDG 3, which aim to end all forms of hunger and malnutrition by 2030. SDG Target 2.2 specifically targets the elimination of malnutrition, including stunting and wasting in children under 5, and the nutrition needs of adolescent girls, pregnant and lactating women, and older persons. SDG 3 emphasizes the need for multisectoral, rights-based and gender-sensitive approaches to address health inequalities and achieve good health for all.

Other SDGs closely related to nutrition and health include SDG 1 (No Poverty), SDG 4 (Quality Education), SDG 5 (Gender Equality) and SDG 6 (Clean Water and Sanitation). Nutrition is central to all 17 SDGs, and each Member State is expected to make efforts to achieve these goals.

III. JUSTIFICATION OF THE NATIONAL AGRICULTURE DEVELOPMENT PLAN

Reduce food insecurity: More than 2 million Liberians are food insecure: According to *The State of Food Security and Nutrition in the World* report (FAO *et al.*, 2023), the prevalence of undernourishment among the population of Liberia remains alarmingly high, at 38.4 percent (2020–2022). This figure signifies that approximately 2 million individuals in the country suffer

from undernourishment, illustrating a considerable gap in achieving SDG 2, which aims to eradicate hunger by 2030.

Roughly 416 000 people require urgent food assistance, according to estimates from the World Food Program (2024). These severely food insecure people are mainly in the areas with the highest food insecurity, such as the southeast counties of Maryland, Sinoe, Grand Kru, Grand Gedeh, River Gee and other counties such as Bong, Lofa, Grand Cape Mount and Gbarpolu (WFP, 2024).

The recent *Rapid Food Security Livelihoods Nutrition and Market Assessment* (WFP, 2022) analysis report also shows that the nutrition status in Liberia is at the “Alert/Stress” level, meaning the country is vulnerable to further shocks. Presently, the incidence of stunting among children under 5 stands at 26.6 percent (FAO *et al.*, 2023).

Build climate change resilience on synergies and links with agrifood system: Liberia is faced with climate change-related risks and vulnerabilities for which the agriculture sector is not an exception. A 2019 report from the Environmental Protection Agency (EPA) of Liberia revealed that warmer temperatures, which have led to a reduction in freezing hours (1:00 am to 5:00 am), are potentially reducing yields for some crops, such as maize, rice, rubber and cassava. Research published in 2011 stated that for every 1 °C increase above 30 °C per day during the maize growing season, there is a corresponding 1 percent reduction in yield each day under optimal rain-fed conditions (Lobell *et al.*, 2011).

According to the EPA, current climatic variability and predicted climate change scenarios for Liberia indicate that the agriculture sector is expected to be significantly undermined by rainfall pattern changes and hotter temperatures, resulting in difficulties in identifying optimal times for crop planting; increased pests, weeds and animal diseases; reductions in soil moisture; and increases in flooding.

This highlights the need to develop a climate change resilience approach by the NAPD to build on synergies and links between climate change and agrifood systems.

Harness the country’s considerable agricultural potential: Since the collapse of the formal economy during the civil war, agriculture has been an important source of economic growth in Liberia. The agriculture sector plays an essential role in food and nutritional security and is a significant sector of the country’s economy, contributing around 30 percent to the gross domestic product (GDP) (International Trade Administration, 2024). The sector employs more than 70 percent of the population (UNDP Liberia, 2022) and provides a valuable export for one of the world’s least developed countries.

Rice, cassava and vegetable production account for 85 percent of cultivated land, corresponding to 80 percent of the country’s agriculture sector, which consists of subsistence farming based mainly on rain-fed agriculture (World Bank, 2021).

Liberia is an agrarian economy endowed with huge agricultural resources that remain underutilized. The country has a comparative advantage in agricultural production, with arable land comprising about 41 percent of the total land area and with 15 major rivers (and several

smaller streams) covering 15 049 km² of fresh water (Central Intelligence Agency, 2022) that could support the development of irrigation infrastructure to facilitate the production of multiple crops annually. In addition to its rich water resources, the country also enjoys high annual rainfall along the coastal areas, with averages between 3 810 mm and 4 320 mm (Platform for Agricultural Risk Management, 2018), which naturally supports two production seasons. These conditions are favourable for the production of diverse crops and animal species, not just to support the country's food security goal but also to provide raw materials for agro-industrial development.

Livestock, including poultry, is a growing subsector in Liberia, and it contributes to the household and community economy and employment with sustenance and food security. It is an integral component of the agricultural economy, performing a role in the livelihoods of poor people. Traditional systems account for 100 percent of the holdings of cattle, goats and sheep; 58 percent of pigs and 100 percent of guinea fowl, according to a 2012 report (Government of Liberia and FAO, 2012). The contribution of agriculture to the GDP is about 36 percent (World Bank, 2022).

The fisheries sector in Liberia is an important component of the food security situation and household livelihood structures for coastal as well as inland communities. Fishing provides 65 percent of the animal protein needs of the country and contributes around 3.2 percent to the GDP. Though it is a key primary source of protein for children in many coastal areas, the fisheries sector in Liberia remains largely underdeveloped.

Reduce poverty: Despite the potential of the agriculture sector in Liberia, the country is in the grip of significant challenges. More than half (59.1 percent) of the population falls below the poverty line, and nearly half of all Liberians are experiencing food poverty (World Bank, 2023). In rural areas, where agriculture is the primary source of livelihood, the poverty rate is close to a staggering three-quarters (72 percent), compared to 32 percent in urban areas. Food poverty is particularly high in rural areas, affecting 51 percent of the population. These figures underscore the pressing need for immediate investment and policy changes to improve the livelihoods of the rural population and enhance food security in Liberia.

The national social protection system includes a range of programs such as cash transfers, labour-intensive public works, support for small businesses, women's empowerment, and other safety net programs.

The National Social Protection Policy and Strategy of 2013 aims to combat hunger, food insecurity and malnutrition, including through the provision of social assistance to vulnerable groups such as children, persons with disabilities and the elderly, alongside safety nets to mitigate seasonal shortages and high food prices. The expansion of school feeding programs and educational initiatives is also prioritized. Additionally, collaboration between the Ministry of Agriculture and the Ministry of Planning and Economic Affairs aims to link social protection program participants with complementary services in the sector to alleviate food insecurity. The policy also envisages rural poverty reduction efforts, including but not limited to redistributing

resources, developing rural infrastructure and addressing common barriers faced by rural vulnerable populations, such as limited market access and seasonal employment constraints.

Implementing the political will of the government through actions and investments

In reaffirming the commitment of the Government of Liberia to transforming its agriculture sector, the Ministry of Agriculture led the process of formulating the second generation of the Liberia National Agriculture Development Plan (called the Agricultural Sector Investment Plan, or LASIP II), which builds on past progress supported by donor actors of the sector. The Government of Liberia also set a strategic long-term vision for the agriculture sector geared towards promoting an inclusive and sustainable agricultural transformation through catalytic investment in agricultural value chains, industrialization and resilience to ensure food and nutrition security, environmental health, job and wealth creation and inclusive growth for Liberians.

The Government of Liberia has committed to fully implementing all agriculture sector policies and to addressing the constraints of the agriculture sector so that Liberians can produce more to feed themselves, generate sufficient income and improve the livelihoods of their families and communities. Addressing the constraints on agricultural development and food security and, eventually, achieving food sovereignty is an overarching objective of the ARREST national development agenda of the Government of Liberia, now being developed.

IV. A CLIMATE CHANGE RESILIENCE APPROACH

To address the climate change-related risks and vulnerability that negatively affect the agriculture sector, the Government of Liberia has developed climate change policy documents and continues to facilitate and implement adaptation projects in the agriculture sector.

Some key steps and initiatives taken by Liberia in its agriculture sector geared towards adapting to climate change vulnerabilities include, but are not limited to, the country's 2021 Revised Nationally Determined Contribution (NDC) for Adaptation in the Agriculture Sector.

▪ Government adaptation options for the agriculture sector

The NDC report identified and prioritized climate change adaptation technologies to be transferred and diffused within the agriculture sector of Liberia:

- Value addition to agriculture products (rice, cassava, vegetables and fruits): establishing major facilities for value addition of agricultural products in rice, cassava, vegetables and fruits
 - Improved storage (drying and freezing of agriculture products), building storage facilities for seed, grain and vegetables in agroecological zones of Liberia
 - Introducing and running soil fertility management facilities in agroecological zones of Liberia
- How does the NADP integrate the government's climate change adaptation priorities for the agriculture sector into its strategic interventions?**

Value addition to agriculture products (rice, cassava, vegetables and fruits): The NADP focuses on this climate change adaptation pathway in its proposed value chain programs on rice, cassava, vegetables and fruits. To overcome the main constraints to value addition to agriculture products, the NAPD's value chain programs propose:

- constructing physical infrastructure and value addition facilities;
- creating value chain and market linkages by providing multistakeholder platforms that facilitate information flows and business transactions between suppliers and buyers;
- rehabilitating farm-to-market roads;
- using better technology and market data;
- ensuring better access to affordable financial products; and
- increasing knowledge about business planning.

Improved storage (drying and freezing of agriculture products), building storage facilities for seeds, grain and vegetables in agroecological zones of Liberia: The lack of storage facilities in Liberia is the cause of produce being lost to rodents, other pests and general deterioration before it reaches the consumer. As a result, farmers sell their produce immediately after harvest to buyers at low prices that are unfavourable to them. The NADP proposes:

- supporting research and extension systems for the development of required technologies;
- enhancing post-harvest handling and access to the market through improved (i) proper harvesting, (ii) handling practices, (iii) storage conditions, (iv) quality sorting, (v) market access and distribution, and (vi) development of a social behaviour change and communication strategy for increased consumption of nutritious foods and improved dietary diversity, including fortified foods; and
- ensuring access to roads, transportation and storage facilities.

Introducing and running soil fertility management facilities in agroecological zones of Liberia: Most of the soils in Liberia are Oxisols and Ultisols that contain oxides of aluminium and iron and are very acidic (with a pH of 3–5). The most alarming crop production problem on these soils is that available plant nutrients are deficient, thus leading to inherent low soil fertility. Presently, deforestation is on the increase in Liberia, resulting in soil erosion, poor soil management and a decline in productivity. The constraints encountered could be linked to barriers impeding the progress of technology.

The NADP proposes adaptation strategies to:

- promote soil management practices;
- build capacities among stakeholders in agriculture production and land-use activities;
- legislate policy on sustainable soil management;
- promote lowland development and integrated farming to reduce upland shifting cultivation and increase sedentary farming;
- improve production through digitalization (introducing user-friendly information and communications technology applications) and capacity building to develop yield-enhancing solutions more effectively;
- adapt to new technology and help use improved and adapted rice seeds;

- develop irrigation to reduce the impacts of flood events;
- support the diversification of both livelihood and cash crops to improve resilience;
- supporting integrated pest management and control; and
- adjust the farming calendar.

▪ **Government adaptation options for the fisheries sector**

The 2021 Revised Nationally Determined Contribution (NDC) report has identified and prioritized climate change adaptation technologies to be transferred and diffused within the fisheries sector of Liberia, including:

- the provision of an early warning system through community science monitoring;
- training to help fishing value chain actors acquire specific skills;
- the availability of marine stores to enable easy access for fishermen to the purchase of fishing gear;
- oven dryers to obviate too much fire and smoke; and
- the building and managing of storage facilities to enable fishermen to preserve their catches and reduce losses.

The NADP, in line with the government priorities identified in the NDC report, proposes adaptation strategies to:

- promote sustainable fisheries investment;
- set up an enabling environment for the development of aqua-business for the growth of the sector;
- support increasing the value of artisanal fisheries through the provision of facilities for ice storage on artisanal craft;
- provide fish drying equipment to support fish processors;
- provide storage facilities that enable fishermen to preserve their catches and reduce losses; and
- support national safety and quality assurance systems to enhance the safety and quality of fish.

V. WHY A VALUE CHAIN DEVELOPMENT APPROACH?

To enable Liberia to fully utilize its agriculture potential, the government of H.E. Joseph Nyuma Boakai, Sr., chooses to adopt a value chain approach to agriculture development and take specific actions to develop the value chains of targeted agricultural commodities that support national food self-sufficiency and development of the national economy.

Investing in the agricultural value chain in Liberia presents numerous opportunities for economic development, food security, poverty reduction and environmental sustainability. By modernizing farming techniques and improving access to inputs and credit, Liberia can increase agricultural productivity and reduce its reliance on food imports. This not only enhances food security but also creates employment opportunities for rural youth and smallholder farmers, contributing to poverty reduction and economic diversification. Opportunities exist to support

vulnerable farmers through existing social protection systems, thereby enabling a gradual transition to sustainable livelihood opportunities.

Furthermore, strengthening value chains can stimulate agro-industrial development and promote value addition and export diversification. By investing in processing infrastructure and quality control measures, Liberia can produce higher-value agricultural products for both domestic and international markets, thereby increasing export earnings and contributing to GDP growth.

Promoting sustainable agriculture practices such as agroforestry and integrated pest management ensures the long-term viability of the agriculture sector in Liberia while preserving the environment. By investing in research and extension services, Liberia can develop innovative solutions to address climate change challenges and enhance the resilience of smallholder farmers to environmental shocks.

Overall, investing in the agricultural value chain in Liberia offers a pathway to inclusive and sustainable economic growth and provides opportunities for smallholder farmers to improve their livelihoods and contribute to the country's development agenda.

VI. LINKS WITH NATIONAL VISION, POLICIES AND STRATEGIES OF THE GOVERNMENT AND PARTNERS

While several policies have been developed to support the development of specific value chains in the agricultural economy of the country, most of these policies either have not been fully implemented or have been implemented with poor results, as the productivity of the sector remains low. For instance, the country developed its first post-conflict National Rice Development Strategy in 2012.

This national agricultural development plan is anchored to the policies and strategies of Liberia, such as: the Vision for the Agricultural Sector (2017–2025); the National Agriculture Development Agenda 2024–2029; the Liberia National Rice Development Strategy II 2018–2030; and the Liberia National Climate Adaptation Plan 2020–2030.

This NADP is linked with the Economic Community of West Africa Agricultural Policy (ECOWAP), adopted by the Economic Community of West African States (ECOWAS), and the ECOWAP Regional Agriculture Investment Plan. It also is linked to the ECOWAP 2025 strategic orientation framework and the objectives and priority areas of the African Union Agenda 2063.

This NADP is also linked to the United Nations Framework Convention on Climate Change and the 2030 Agenda for Sustainable Development.

VII. THE DEVELOPMENT OBJECTIVE OF THE NADP

The development objective of the NADP is to enable Liberia to fully exploit its agricultural potential to enhance food security, nutrition and access to affordable healthy diets for the Liberian people by promoting sustainable productivity growth in the agriculture sector through agricultural climate change adaptation technologies aimed at developing the value chains of targeted agricultural products that support national food self-sufficiency and the development of the national economy.

VIII. SPECIFIC OBJECTIVES

The specific objectives are to promote the main value chains that underpin food self-sufficiency and access to an affordable healthy diet and that contribute to the growth of the country's economy. This NADP covers two main groups of investments:

1. Specific investments to the targeted agriculture value chains:
 - food crops (rice, cassava, maize, high-nutrient vegetables)
 - cash crops (rubber, cocoa and coffee)
 - fruit crops (papayas, avocados, mangoes, citrus, bananas)
 - livestock (cattle, sheep and goats, poultry and pigs)
 - fisheries and aquaculture

2. Cross-cutting investments that address common issues across the value chains:
 - mechanization, with a focus on the creation of mechanization hubs in production clusters for both production and post-harvest handling
 - strengthening agricultural research and extension capacities to promote innovative technical approaches
 - developing inclusive agribusiness models for the integration of smallholders into agrifood value chains
 - access to finance through the establishment of the agriculture enterprise development bank
 - strengthening the capacity of the Ministry of Agriculture

IX. SPECIFIC INVESTMENTS OF THE TARGETED AGRICULTURE VALUE CHAINS

A specific development plan for each value chain is appended to this document, summarizing the main investment areas' priorities, expected results and costs.

9.1. FOOD CROPS VALUE CHAIN

9.1.1. RICE VALUE CHAIN

Expected outputs

- 50 000 ha of lowland for irrigated rice production developed over five years
- Appropriate business environment created to attract private-sector involvement, including from women and youth, in large-scale commercial rice production and processing in five major rice production clusters

- Rice production units (cooperatives), including women and youth, established in five major rice production clusters
- Post-harvest management facilities (rice mills, warehouses) constructed in five major rice production clusters to facilitate post-harvest handling
- National rice self-sufficiency achieved by 70 percent over five years
- Rice importation reduced by 70 percent over five years
- Post-harvest losses decreased by 15 percent within two years of NADP implementation
- Rice farmers' incomes enhanced by 30 percent over the next five years

Key strategic interventions

- Support farmers in increasing the production and processing of the country's main staple food crop, rice, and promote the commercialization of the rice value chain through: (i) incentivized private-sector participation in certified rice seed production for supply to farmers; (ii) 50 000 ha of lowland for irrigated rice production developed over five years; and (iii) appropriate business environment created to attract private-sector involvement in large-scale commercial rice production and processing in five major rice production clusters.
- Establish rice production units (cooperatives) in five major rice production clusters/regions and support them to annually develop 3 000 ha of lowland for rice production.
- Construct post-harvest management facilities (rice mills, warehouses) in five major rice production clusters to facilitate post-harvest handling.
- Invest in research and innovation to develop new varieties of rice that are more resilient to pests, diseases and changing climatic conditions.
- Invest in high-quality seed production to ensure improved yields and quality of rice crops.
- Enhance the irrigation infrastructure to support a consistent and reliable water supply for rice cultivation.
- Develop storage facilities and efficient logistics systems to reduce post-harvest losses and ensure the timely delivery of rice to markets.

Investment cost of the rice value chain

TABLE 4: INVESTMENT COST FOR RICE DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|---------------------------|-------------|
| Lowland development | 165 000 000 |
| Storage facilities | 750 000 |
| Laboratory facilities | 2 250 000 |
| Equipment (tractor) | 0 |
| Equipment (power tiller) | 250 000 |
| Equipment (rice mill) | 7 660 000 |
| Training, advanced | 795 000 |
| Training of farmers | 650 000 |

| | |
|----------------------|--------------------|
| Logistics (vehicles) | 900 000 |
| TOTAL | 178 255 000 |

NOTE: The cost of the tractors has been merged with the costs under mechanization program.

9.1.2. CASSAVA VALUE CHAIN

Expected outputs

- Under mechanized cassava cultivation developed over five years
- 10 000 cassava production units (cooperatives) with 20 members each cultivating 2 ha (5 acres) established in six designated counties
- Appropriate business environment created to attract private-sector investment in large-scale commercial cassava production and value addition in six major production counties
- Creation of aggregation units facilitated to link fresh cassava root producers to processors
- Cassava cutting multiplication sites (10 ha each) established in six major cassava-producing counties of Liberia
- Cassava yield increased by a minimum 20 t/ha

Key strategic interventions

- Facilitate the introduction of high-yielding cassava varieties and improved production technologies for use by local farmers through access to improved productive inputs, planting materials and extension services and through access to labour-saving technologies (mechanization).
- Support the formation and empowerment of cassava production cooperatives in designated counties for large-scale cassava production.
- Encourage private-sector investment in the establishment of large-scale cassava processing plants for the transformation of fresh cassava roots into starch and other products.
- Support the agriculture infrastructure for the development of the cassava value chain through: (i) the development/erection of strategic market infrastructure (such as warehouses, cold storages, solar farms, processors and aggregation wagons) to facilitate and link market participants; and (ii) the development of policies and structures to support contractual arrangement, communal farming and regulations to ensure farmers and the private sector have a mutual understanding of a market-driven supply and demand of cassava outputs.
- Facilitate market linkages and market development initiatives to create demand for value-added vegetable products, promote consumer awareness, and facilitate market access for processed and branded vegetable products.
- Stimulate agriculture finance and private-sector investment in the cassava value chain.

Investment cost of the cassava value chain

TABLE 5: INVESTMENT COST FOR CASSAVA DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|---|-------------------|
| Improve infrastructure along the cassava value chain | 26 885 000 |
| Improve access to finance along the cassava value chain | 45 000 |
| Develop and strengthen access to inputs and extension and advisory service to ensure adequate sustainable production and processing along the value chain | 280 000 |
| Empower smallholder farmer organizations and foster an entrepreneurship mindset | 20 000 |
| TOTAL | 27 230 000 |

9.1.3. MAIZE VALUE CHAIN

Expected outputs

- 20 000 ha of secondary forestland under mechanized maize production developed over five years
- 10 000 maize production units (cooperatives) with 20 members each cultivating 2 ha (5 acres) established in six designated counties
- Appropriate business environment created to attract private-sector investment in large-scale commercial maize production and animal feed processing to support poultry and fish production
- Maize production growth by more than 100 percent annually over the first two years
- Access to maize post-harvest management technology increased, and post-harvest losses reduced by 10 percent annually over five years
- Access to affordable maize for animal feed production increased by 75 percent in the first two years
- Adoption of on-farm feed production increased by 30 percent in five years

Key strategic interventions

- Promote on-farm and community-based feed production through: (i) establishing small-scale and community-based feed processing facilities; (ii) providing technical training and facilitating supporting to farmers, including women and youth, on on-farm feed production techniques; (iii) facilitating the harnessing of farmers' cooperatives to enable farmers, including women and youth, to collectively purchase feed ingredients in bulk at discounted rates; (iv) embedding in all extension modules and farmer field schools curricula that educate farmers, including women and youth, on efficient feeding practices, feed management and nutritional requirements for poultry and fish farming; and (v) facilitating private-sector investment in the establishment of large feed companies.
- Promote access to affordable inputs to support smallholder farmers, including women and youth, in increasing their harvests by: (i) promoting the development and adoption

of improved planting materials that are resilient to pests, diseases and environmental stresses; and (ii) strengthening capacity in maize research and development to develop and disseminate improved varieties.

- Improve post-harvest handling and storage through: (i) facilitating the fabrication of low-cost but gender-friendly processing equipment and machinery for maize feed production; (ii) promoting training and capacity building for farmers, including women and youth, on value addition and agribusinesses techniques for turning maize into feed; and (iii) facilitating storage (cool rooms).
- Establish market linkages through: (i) promoting quality assurance and certification standards for maize feed production to enhance consumer trust and market acceptance; and (ii) promoting the establishment of a market system platform that provides maize prices and demand trends to maize value chain stakeholders, including women and youth.

Investment cost of maize value chain

TABLE 6: INVESTMENT COST FOR MAIZE DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|---|-------------------|
| Promote on-farm feed production | 1 200 000 |
| Facilitate access to affordable inputs | 2 350 500 |
| Increase production and crop area | 13 500 000 |
| Improve post-harvest handling and storage | 700 000 |
| Establish market linkages | 300 000 |
| Total | 18 050 500 |

9.1.4. VEGETABLE VALUE CHAIN

Expected outputs

- 2 000 ha of farmland mechanically developed and outfitted with sprinkler or drip irrigation systems for the cultivation of assorted vegetables (500 ha each for tomatoes, peppers, beans and groundnuts)
- ten greenhouses constructed on designated community college and university farms to be used for the cultivation of high-value vegetables (cabbage, lettuce, collards, carrots, onions, tomatoes and watermelons)
- 25 percent higher vegetable yields
- 50 percent reduction in post-harvest losses of vegetables
- 500 farmers provided access to agriculture machinery and other labour-saving technologies for land preparation and crop cultivation
- 5 000 farmers provided access to improved inputs and technology for vegetable production
- 2 000 small and medium enterprises (SMEs) in the vegetable value chain receive investment financing

- 5 000 vegetable value chain actors receive financial literacy training
- 20 stakeholder coordination events convened for vegetable value chain actors
- ten vegetable value addition and processing facilities developed
- capacities of 1 000 SMEs strengthened in value addition, food safety, quality control and product innovation
- infrastructure at ten vegetable markets improved with cold storage, refrigerated trucks, washing and packaging centers and quality control labs
- 2 000 vegetables producers equipped with standard units of measurement
- 10 000 vegetable producers provided access to market information

Key strategic interventions

- Increase the production and productivity of vegetables through: (i) enhanced access to improved inputs and technology (planting materials, tools and agrochemicals); (ii) increased access among farmers to agricultural machinery and other labour-saving technologies for use in land preparation and crop cultivation processes (irrigation systems, greenhouses, precision agriculture, etc.); and (iii) enhanced delivery of agricultural extension and advisory services.
- Improve investment and financing through: (i) increased investment and access to financing for vegetable value chain activities; (ii) enhanced financial literacy and financial management skills among vegetable value chain stakeholders (smallholder farmers, agribusinesses and entrepreneurs); and (iii) facilitated investment promotion initiatives to attract domestic and foreign investors interested in financing projects and ventures within the vegetable value chain, including production, processing, marketing and infrastructure development (post-harvest infrastructure, such as cold storage facilities, packing houses and processing plants).
- Improve value addition and marketing through: (i) supported investment in infrastructure for value addition (including processing facilities, packaging centers and quality control labs) to support small-scale processors and entrepreneurs; and (ii) improved market infrastructure (including wholesale markets, market stalls and market information systems) to improve market access, transparency and efficiency for vegetable producers and buyers.
- Facilitate market linkages and market development initiatives to create demand for value-added vegetable products, promote consumer awareness and facilitate market access for processed and branded vegetable products.

Investment cost of the vegetable value chain

TABLE 7: INVESTMENT COST OF VEGETABLE DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|--|-------------------|
| Increasing production and productivity of vegetables through enhanced access to improved inputs and technology | 10 000 000 |
| Improving investment and financing | 12 000 000 |
| Improving value addition and marketing | 10 000 000 |
| TOTAL | 32 000 000 |

9.2. CASH CROP VALUE CHAIN

Over the past five years, the cocoa and coffee sectors in Liberia have shown variable production and productivity trends. Despite boasting fertile land conducive to cocoa production, the sector has faced challenges in realizing its full potential. Cocoa production, which stood at 22 000 tonnes in 2021, experienced a slight decline to 20 000 t in 2022. This decline may be attributed to various factors, including weather fluctuations, pest and disease outbreaks, and socioeconomic issues affecting smallholder farmers.

Despite these challenges, recent price upturns and increased participation in cocoa and coffee farming offer renewed hope for the sectors. However, sustainable growth and resilience necessitate a holistic approach that addresses productivity constraints, improves market access and efficiency, and fosters modernization across the entire value chain.

Liberia has a long and proud history of having the largest rubber plantation sector in Africa, and this has been the strongest, most reliable and most sustainable economic anchor since it began yielding measurable benefits after the 1930s. Rubber remains the top industry in export earnings and has survived the ravages of war. Today, this vital industry is facing a severe crisis of profitability and sustainability, and its stakeholders are facing a decisive moment. Natural rubber is the most important agricultural export commodity in Liberia and a source of income for many rural dwellers. Small and medium farms dominate the sector and cover more than 5 percent of the agricultural land (Mulbah, Ritho and Mburu, 2019). Natural rubber accounted for about 85 percent of the total export earnings from 2003 to 2010 (Tyson, 2017). Liberia is ranked the fourteenth-highest producer of natural rubber globally and second in Africa, with overall export data of 125 432 t from July 2021 through the end of 2022 (Mulbah, Ritho and Mburu, 2019).

Investing in the agricultural cash crop value chain in Liberia presents numerous opportunities for economic development, food security, poverty reduction and environmental sustainability.

Furthermore, strengthening value chains can stimulate agro-industrial development, promoting value addition and export diversification. By investing in processing infrastructure and quality control measures, Liberia can produce higher-value agricultural products for both domestic and international markets, thereby increasing export earnings and contributing to GDP growth.

9.2.1. COCOA VALUE CHAIN

Expected outputs

- 25 000 ha of new cocoa farms established in five cocoa-producing counties over five years
- National cocoa gardens established in five cocoa-producing counties to provide improved planting materials for cocoa farmers
- National cocoa research institute established to support cocoa value chain development
- National cocoa board established to guide the development of the value chain

Key strategic interventions

- The Ministry of Agriculture and its partners will promote cocoa farm-level productivity enhancement and new planting by: (i) facilitating sustainable cocoa farming; (ii) building research capacity on cocoa; (iii) rehabilitating old farms; (iv) rehabilitating and equipping agronomic laboratories; (v) facilitating extension services and agronomical practices; and (v) facilitating market research and data collection.
- The Ministry of Agriculture will promote post-harvest and value addition by: (i) strengthening the capacities of communities on post-harvesting activities, engaging youth in cocoa farming, and mainstreaming gender in the value chain; (ii) supporting private-sector intervention to encourage local manufacturing; and (iii) facilitating access to finance for sustainable value addition.

Investment cost of cocoa value chain

TABLE 8: INVESTMENT COST FOR COCOA VALUE CHAIN DEVELOPMENT

| COMPONENT/PRIORITY | TOTAL (USD) |
|--|-------------------|
| 25 000 ha cocoa landscape cultivation: increase production | 26 250 000 |
| National cocoa gardens established in five cocoa-producing counties to provide improved planting materials for cocoa farmers | 3 570 000 |
| National cocoa research institute established to support cocoa value chain development | 815 000 |
| National cocoa board established to provide guidance for development of the value chain | 640 000 |
| TOTAL | 31 275 000 |

9.2.2. COFFEE VALUE CHAIN

Expected outputs

- Revive the coffee subsector and develop appropriate programs to sustain activities in the sector

- 15 000 ha of new smallholder coffee farms, including those involving women and youth, developed over five years through a tailored program
- National coffee research introduced and strengthened under CARI's crop programs to support coffee value chain development

Key strategic interventions

- The Ministry of Agriculture and its partners will promote coffee farm-level productivity enhancement by: (i) establishing a sub research station for coffee under CARI; and (ii) establishing coffee mother gardens for increased access to improved planting materials on a timely basis.
- The Ministry of Agriculture and its partners will promote sustainable, research and capacity development by providing coffee farmers with training and technical assistance on the best techniques for planting, harvesting and post-harvest processing.
- The Ministry of Agriculture and its partners will promote market access and value addition by: (i) creating market linkages for coffee growers and cooperatives with both local and international buyers; and (ii) supporting value-added operations such as coffee roasting, packaging and branding.
- The Ministry of Agriculture and its partners will promote infrastructure development by: (i) investing in infrastructure such as coffee processing facilities, storage warehouses and transportation networks; and (ii) upgrading local infrastructure to assist in reducing post-harvest losses, improving quality control and increasing market access for coffee farmers.
- The Ministry of Agriculture and its partners will promote policy and regulatory support by: (i) advocating for coffee-friendly policies and regulations, such as land tenure reform, and increased access to finance; and (ii) establishing a favourable policy climate with quality enforcement.

Investment cost of the coffee value chain

TABLE 9: INVESTMENT COST FOR COFFEE DEVELOPMENT, USD

| COMPONENT/PRIORITY | TOTAL |
|--|-------------------|
| 15 000 ha coffee landscape cultivation: increase production | 15 750 000 |
| Revive the coffee subsector and develop appropriate programs to sustain activities in the sector | 13 500 000 |
| National coffee research institute established to support cocoa value chain development | 3 356 890 |
| TOTAL | 32 606 890 |

9.2.3. CASHEW VALUE CHAIN

Expected outputs

- 10 000 ha of greenfield cashew plantation developed through a program for smallholders, including women and youth
- 5 000 cashew farmers, of which 60 percent are youth and women, trained in cashew cultivation
- National cashew production and local value addition expanded through support to private-sector initiative
- Cashew research program developed and supported at CARI
- National cashew gardens established in designated cashew production zones to facilitate access among farmers, including women and youth, to improved planting material

Key strategic interventions

- The Ministry of Agriculture and its partners will promote farm-level productivity enhancement by: (i) providing training and technical assistance to farmers, including women and youth, on good agriculture practices related to cashews; and (ii) providing access to quality agro-inputs.
- The Ministry of Agriculture and its partners will promote processing and value addition by: (i) establishing processing plants for shelling, drying and packaging cashew nuts; and (ii) facilitating the value addition of cashew kernels into roasted cashews, cashew butter and cashew milk to diversify the product range and increase market competitiveness.
- The Ministry of Agriculture and its partners will promote market access and market linkages by: (i) facilitating market access for cashew farmers and cooperatives, including women and youth; (ii) establishing market linkages with local and international buyers; (iii) enforcing the quality and uniqueness of Liberian cashew products; and (iv) facilitating participation in trade fairs and exhibitions to showcase the country's cashew industry.
- The Ministry of Agriculture and its partners will promote capacity building and training by providing training and capacity-building programs for farmers, processors and other stakeholders, including women and youth, in the cashew value chain and post-harvest handling.
- The Ministry of Agriculture and its partners will promote policy advocacy and an enabling environment by: (i) supporting policies and regulations for the cashew sector; and (ii) addressing policy barriers; and (iii) facilitating a favourable business environment.

Investment cost of cashew value chain

TABLE 10: INVESTMENT COST FOR CASHEW DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|---|-------------------|
| 10 000 ha of greenfield cashew plantation developed through smallholder support program | 10 500 000 |
| 5 000 cashew farmers, of which 60 percent are youth and women, trained in cashew cultivation | 5 028 300 |
| National cashew production and local value addition expanded through support to private-sector initiative | 8 000 000 |
| Cashew research program developed and supported at CARI | 1 500 000 |
| National cashew gardens established in designated cashew production zones to facilitate farmers' access to improved planting material | 3 850 700 |
| TOTAL | 28 879 000 |

9.2.4. COCONUT VALUE CHAIN

Expected outputs

- Support for the cultivation of 2 million new coconut trees in the southeastern coastal counties of Rivercess, Sinoe, Grand Kru and Maryland
- Private-sector investment, including among women and youth, facilitated to support local value addition of coconut and coconut by-products
- National coconut research program developed and supported at Tubman University to create innovation in the coconut industry
- Coconut seedling gardens established in four designated counties through private-sector initiatives, including among women and youth, for the production and distribution of improved varieties of coconut seedlings

Key strategic interventions

- The Ministry of Agriculture and its partners will promote farm-level productivity enhancement of coconut by: (i) providing training and technical assistance to improve farming practices; (ii) providing access to quality inputs; (iii) facilitating post-harvest handling and processing; (iv) encouraging technology adoption among farmers, including women and youth; and (v) facilitating market linkages and value addition.
- The Ministry of Agriculture and its partners will promote research and capacity building by: (i) conducting cultivation and processing studies critical for increasing productivity and quality; (ii) facilitating the establishment of the best synchronization of planting date and best practices for disease and pest control; (iii) investing in the development of post-harvest handling and processing technology; (iv) establishing a subsidiary research station under the national coconut research station and boosting universities in

areas with strong coconut production; and (v) facilitating collaboration for information sharing and technology transfer in the coconut value chain.

Investment cost of the coconut value chain

TABLE 11: INVESTMENT COST FOR COCONUT DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|---|-------------------|
| Support cultivation of 2 million new coconut trees in the southeastern coastal counties of Reverses, Sinoe, Grand Kru and Maryland | 1 396 500 |
| Private-sector investment facilitated to support local value addition of coconut and coconut by-products | 14 738 300 |
| National coconut research program developed and supported at Tubman University to develop innovation in the coconut industry | 11 586 360 |
| Coconut seedling gardens established in four designated counties through private-sector initiative for the production and distribution of improved varieties of coconut seedlings | 2 529 540 |
| TOTAL | 30 250 700 |

9.2.5. RUBBER VALUE CHAIN

Expected outputs

- 20 000 ha of new smallholder rubber farms, including those involving women and youth, established in the six major rubber-producing counties through the supply of improved and high-yielding clones
- 10 000 ha of existing farms rehabilitated in six rubber-producing counties
- National rubber research institute established to stimulate innovation development in the rubber industry
- Local rubber value addition capacity strengthened through increased access to unprocessed rubber.

Key strategic interventions

- Creating the enabling environment for improved natural rubber production and productivity, value addition and marketing through: (i) strengthened capacity of relevant public institutions to provide quality services for enhanced production, value addition and marketing; (ii) enhanced value chain coordination and public–private dialogue; and (iii) enhanced delivery of agricultural research and extension services.
- Improving the production and productivity of the rubber sector through: (i) enhanced access for farmers to improved clones, training, nursery development, multiplication and distribution to farmers, including women and youth; (ii) procurement and distribution of productive inputs to farmers, including women and youth, such as access

to farm equipment and machines, fertilizers and agrochemicals, and extension and advisory services; (iii) introduction of innovative technologies for enhanced rubber farming, including mechanization and irrigation, and for attracting youth and women to rubber farming; and (iv) improved access to finance for farmers and processors, including women and youth, and tailored-made financing initiatives for farmers and processors, including women and youth (via grants, loans or both).

- Accelerating domestic-level value addition and marketing through: (i) enhanced private-sector investment in value addition through the promotion of public–private partnerships; (ii) strengthened capacity of farmers, traders and processors in quality standards and market requirements of rubber and derivatives, including through capacity building for farmers’ organizations, including women and youth, the adoption of innovative technologies for enhanced value addition, and the promotion of infrastructure development (storage, processing facilities, etc.); and (iii) enhanced access to finance by rubber farmers and SMEs including women and youth.

Investment cost of rubber value chain

TABLE 12: INVESTMENT COST FOR RUBBER DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|--|-------------------|
| 20 000 ha of new smallholder rubber farms established in the six major rubber-producing counties through the supply of improved and high-yielding clones | 15 750 000 |
| 10 000 ha of existing farms rehabilitated in six rubber-producing counties | 6 300 000 |
| National rubber research institute established to stimulate innovation development in the rubber industry | 15 225 000 |
| 20 SMEs have improved and increased access to unprocessed rubber (latex and cuplun) and are manufacturing/processing rubber in Liberia | 15 225 000 |
| TOTAL | 52 500 000 |

9.3. FRUIT CROP VALUE CHAIN

The cultivation of fruit crops such as papayas, avocados, citrus, mangoes, coconuts and bananas, among others, has a longstanding tradition in Liberia, though on a small scale. Both urban and rural households have historically cultivated these crops within their yards and communities for various purposes, including food consumption, beautification, shade and wind control. The tropical climatic conditions in Liberia have provided an ideal environment for the production of these crops, ensuring their seasonal availability throughout the country year-round. In Liberia, there is an intrinsic connection between the environment and agricultural practices. The cultivation of these crops has been deeply embedded within local traditions and

lifestyles, as they serve as essential sources of nutrition, livelihoods and cultural significance for communities across the country.

Fruit crops have the potential to diversify the agriculture sector in Liberia, which has been dominated by tree crops, while lavishing their high nutritional value and potential to improve local rural communities' diets, especially for women and children.

9.3.1. PAPAYA VALUE CHAIN

Expected outputs

- 1 000 ha of improved papaya plantation established through support for smallholder farmers, including women and youth
- Institutional capacity of interested private-sector actors, including women and youth, strengthened in major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings
- Development of local papaya trade facilitated to creation offtake opportunities for producers
- Access to post-harvest management facilities and technology, including for women and youth, improved to reduce post-harvest loss

Key strategic interventions

- The Ministry of Agriculture will enhance the production of papaya orchards by: (i) facilitating the distribution of superior and dwarf papaya varieties to households, including among women and youth, around Liberia; (ii) integrating papaya production in the national periurban agriculture program to attract youth and urban residents to join in agriculture cultivation, as in backyard garden strategies; (iii) assessing for new climate profiles and identifying non-forest lands suitable for developing new and large papaya orchards among farmers, including women and youth; (iv) making efforts to attract large orchard investors, including women and youth, for avocado production within the value chain.
- The Ministry of Agriculture will promote agroforestry and intercropping practices to maximize land use and increase productivity.
- CARI, with facilitation from the Ministry of Agriculture, will develop a papaya seed garden and different seedling distributions within all five agriculture regions.
- The Ministry of Agriculture will enhance post-harvest handling and access to the market by improving proper harvesting, handling practices, storage conditions, quality sorting, market access and distribution for smallholder farmers, including women and youth.

Investment of the papaya value chain

TABLE 13: INVESTMENT COST FOR PAPAYA DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|------------------------|------------|
| Production enhancement | 10 000 000 |

| | |
|--|-------------------|
| Post-harvest handling and created research program | 7 890 000 |
| TOTAL | 17 890 000 |

9.3.2. AVOCADO VALUE CHAIN

Expected outputs

- 5 000 ha of avocado plantation established through support for smallholder producers, including women and youth
- Institutional capacity of interested private-sector actors, including women and youth, strengthened in major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings
- Development of the local avocado trade facilitated to creation offtake opportunities for producers, including women and youth

Key strategic interventions

- The Ministry of Agriculture will promote avocado production by: (i) attracting large orchard investors, including women and youth, for avocado production; (ii) integrate avocado cultivation in national agroforestry and intercropping practices; and (iii) developing an avocado seed garden
- The Ministry of Agriculture will enhance post-harvest handling and access to market for avocado farmers and producers, including women and youth, by: (i) improving proper harvesting, handling practices, storage conditions, quality sorting, market access and distribution and different seedlings distributions within all the five agriculture regions.

Investment cost of the avocado value chain

TABLE 14: INVESTMENT COST FOR AVOCADO DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|--|-------------------|
| Production enhancement | 15 000 000 |
| Post-harvest handling and created research program | 11 669 500 |
| TOTAL | 26 669 500 |

9.3.3. MANGO VALUE CHAIN

Expected outputs

- 1 000 ha of improved mango plantation established through support for smallholder farmers, including women and youth

- Institutional capacity of interested private-sector actors, including women and youth, strengthened in major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings
- Development of local mango trade facilitated to creation offtake opportunities for producers, including women and youth
- Access to post-harvest management facilities and technology improved to reduce post-harvest loss

Key strategic interventions

- The Ministry of Agriculture will promote the production of mangoes by: (i) revitalizing the production capacity of old and abandoned mango plantations; (ii) promoting the cultivation of new mango plantations among smallholder farmers, including women and youth; (iii) support smallholder farmers, including women and youth, in access to agricultural inputs and equipment; and (iv) provide training to farmers on best practices regarding mango plantation management and production.
- The Ministry of Agriculture will enhance post-harvest handling and access to the market by: (i) facilitating the strengthening and technical capacity of smallholder farmers across all five agricultural regions to venture into simple mango value addition; (ii) facilitating the local fabrication of tools or equipment; and (iii) attracting large mango product base developers, including women and youth, to venture into the Liberian market.

Investment cost of the mango value chain

TABLE 15: INVESTMENT COST FOR MANGO DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|--|-------------------|
| Revitalization and production enhancement | 8 000 000 |
| Enhancing post-harvest handling and access to market | 10 570 000 |
| TOTAL | 18 570 000 |

9.3.4. CITRUS VALUE CHAIN

Expected outputs

- 5 000 ha of plantation of smallholder farmers, including women and youth, established for the production of improved citrus varieties
- Institutional capacity of interested private-sector actors, including women and youth, strengthened in major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings
- Development of local citrus trade facilitated to create offtake opportunities for producers, including women and youth
- Access to post-harvest management facilities and technology improved to reduce post-harvest loss

Key strategic interventions

- The Ministry of Agriculture will promote citrus production by: (i) revitalizing the production capacity of old and abandoned citrus plantations, encompassing soil improvement, pruning, pest and disease management and the replacement of aged or diseased trees; (ii) promoting the cultivation of new citrus plantations among smallholder farmers, including women and youth; (iii) supporting smallholder farmers, including women and youth, in accessing agricultural inputs and equipment; and (iv) provide training to farmers, including women and youth, on the best practices for citrus plantation management and production.
- The Ministry of Agriculture will enhance post-harvest handling and access to market by: (i) facilitating the strengthening and/or technical backstopping of farmers and cooperatives, including women and youth, across the five agricultural regions; (ii) promoting improved infrastructure; (iii) facilitating the development of regional cold storage facilities by the Liberia Agriculture Commercialization Regulatory Authority (LACRA); and (iv) improving port facilities for the exportation of quality citrus produce.

Investments cost of the citrus value chain

TABLE 16: INVESTMENT COST FOR CITRUS DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|--|-------------------|
| Revitalization and production enhancement | 11 000 000 |
| Enhancing post-harvest handling and access to market | 11 000 000 |
| TOTAL | 22 000 000 |

9.3.5. BANANA VALUE CHAIN

Expected outputs

- 5 000 ha of banana orchard developed and established among smallholder or larger-scale farmers, including women and youth
- National banana research introduced and strengthened for the production of improved banana varieties and post-harvest and value-addition techniques
- A joint national plantain and banana steering committee established
- Capacity strengthened among interested private-sector actors, smallholder farmers and community members, including women and youth
- National banana production belt established
- Development of local banana trade facilitated to creation offtake opportunities for producers, including women and youth
- Access to post-harvest management facilities and technology improved to reduce post-harvest loss

Key strategic interventions

- The Ministry of Agriculture will promote the production and research of bananas by: (i) facilitating the expansion of existing banana orchards; (ii) supporting the development of new banana orchards; (iii) strengthening the capacities of smallholder farmers and community dwellers, including women and youth, on good agriculture practices for banana production; (iv) supporting banana entrepreneurship; (v) facilitating CARI to begin banana research (molecular and traditional) to support and provide farmers and other stakeholders, including women and youth, with improved banana suckers; (vi) attracting large-scale banana farming; and (vii) supporting smallholder farmers, including women and youth, in accessing agricultural inputs and equipment.
- The Ministry of Agriculture will also enhance post-harvest handling and market accessibility for bananas by: (i) facilitating the strengthening and/or technical backstopping of farmers and cooperatives, including women and youth, across the five agricultural regions; (ii) promoting improved infrastructure; (iii) facilitating the development of regional cold storage facilities by the LACRA; and (iv) improving port facilities for the exportation of quality banana produce.

Investment cost of the banana value chain

TABLE 17: INVESTMENT COST FOR BANANA DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|--|-------------------|
| Production and research enhancement | 25 000 000 |
| Post-harvest handling and market accessibility enhancement | 6 216 250 |
| TOTAL | 31 216 250 |

9.4. LIVESTOCK VALUE CHAIN

9.4.1. CATTLE VALUE CHAIN

Expected outputs

- Seven major cattle production ranches across the country rehabilitated and restocked
- National cattle breeding program developed to support the expansion of local cattle production
- National livestock policy formulated to guide the development of the sector
- National veterinarian service delivery system strengthened

Key strategic interventions

- The Ministry of Agriculture will rehabilitate and restock seven major ranches by improving infrastructure, organizing and planning grazing areas for cattle, rehabilitating livestock watering points, increasing cattle up to ten per hectare, planning livestock vaccination and improving veterinary care.
- The Ministry of Agriculture and CARI will develop a national cattle breeding program to support the expansion of local cattle production.

- The Ministry of Agriculture will formulate, with breeders and technical partners, a national livestock policy to guide the development of the sector.
- The Ministry of Agriculture will strengthen the national veterinarian service delivery system by training veterinary officers; improving diagnostic, prevention and treatment methods and means for the most prevalent animal diseases; and improving the logistics of veterinary service operations.
- The Ministry of Agriculture will enable the livestock policies and regulatory framework to promote sustainable practices to safeguard natural resources and mitigate environmental impacts.

Investment cost of the cattle value chain

TABLE 18: INVESTMENT COST FOR CATTLE DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|---|-------------------|
| Rehabilitate and restock seven major ranches | 36 000 000 |
| Develop a national cattle breeding program to support the expansion of local cattle production | 3 000 000 |
| Elaborate a national livestock policy to guide the development of the sector | 0 |
| Strengthen the national veterinarian service delivery system | 5 999 240 |
| Enable livestock policies and regulatory framework to promote sustainable practices to safeguard natural resources and mitigate environmental impacts | 1 000 000 |
| Total | 45 999 240 |

9.4.2. SMALL RUMINANTS (GOATS AND SHEEP) VALUE CHAIN

Expected outputs

- Goats and sheep restocked in six counties (Nimba, Lofa, Bong, Grand Gedeh, Grand Bassa and Bomi) to enhance food security and livelihoods

Key strategic interventions

- Conduct a thorough assessment of the local context (including environmental conditions, socioeconomic factors, existing livestock practices and market dynamics) to tailor the restocking program to specific needs and priorities.
- Develop strategies for the genetic improvement of the restocked populations (including selective breeding, controlled mating and introduction of superior genetics) through artificial insemination or breeding programs to enhance productivity and resilience over time.
- Provide training and capacity-building programs for farmers and extension workers, including women and youth, on sustainable livestock management practices (including breeding techniques, health care, nutrition, pasture management and climate-smart agriculture) to enhance their skills and knowledge.

- Improve access to veterinary services (including vaccination programs, disease surveillance and treatment of common livestock diseases) by strengthening veterinary infrastructure and training local veterinarians and paraveterinary workers.
- Invest in the necessary infrastructure to support restocking activities (such as breeding centers, quarantine facilities, veterinary clinics, water sources and fencing) to ensure the health and well-being of the restocked animals.

Investments cost of the sheep and goats value chain

TABLE 19: INVESTMENT COST FOR SHEEP AND GOAT DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|--|----------------|
| Increase the population of resilient and locally adapted breeds of sheep and goats in six targeted counties (Nimba, Lofa, Bong, Grand Gedeh, Grand Bassa and Bomi) to enhance food security and livelihoods | 610 000 |
| Empower smallholder farmers, especially women and youth, by providing them with access to resilient breeds of sheep and goats for breeding, income generation and nutrition, thereby contributing to poverty alleviation and gender equality | 255 000 |
| TOTAL | 865 000 |

9.4.3. POULTRY VALUE CHAIN

Expected outputs

- Four large-scale indigenous poultry farmers, including women and youth, supported in engaging in broiler production to reduce poultry meat import into Liberia by 75 percent over five years
- Four commercial layer farmers provided with incentives for egg production to achieve national self-sufficiency
- Private-sector investment facilitated in establishing local hatcheries for day-old chick production
- Farmer-based organizations in nine counties to implement modern poultry farms involving at least 2 800 farmers, who will be supported by the Ministry of Agriculture and its partners in increasing poultry production (meat and layers) to reduce the poultry meat import into Liberia by 75 percent over five years

Key strategic interventions

- Support the construction of poultry houses in nine counties
- Support the implementation of four large-scale Indigenous poultry farms
- Facilitate private-sector investment for the establishment of local hatcheries for day-old chick production
- Support four commercial layer farmers by providing incentives for egg production to achieve national self-sufficiency

Investment cost of the poultry value chain

TABLE 20: INVESTMENT COST FOR POULTRY DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|---|------------------|
| Support the construction of poultry houses in nine counties | 837 450 |
| Support the implementation of four large-scale indigenous poultry farms | 300 000 |
| Support the implementation of four large-scale indigenous poultry farmers | 450 000 |
| TOTAL | 1 587 450 |

9.4.4. PIGGERY VALUE CHAIN

Expected outputs

- At least 1 225 farmers supported in 15 counties to increase pig production by 10 percent per year

Key strategic interventions

- Improve breeding and genetics by: (i) introducing high-quality pig breeds that are well-suited to the local environment and that have such desirable traits as fast growth, high meat yield and disease resistance; (ii) implementing breeding programs to improve the genetics of the local pig population and enhance overall productivity; and (iii) train farmers on proper breeding practices, including the selection of breeding stock, mating techniques and the management of breeding programs.
- Enhance feeding and nutrition by supporting farmers, including women and youth, by: (i) developing appropriate feed formulations using locally available feed ingredients to meet the nutritional requirements of pigs at different stages of growth; (ii) promoting sustainable feeding practices by incorporating feed additives, minerals and vitamins to optimize pig health and growth; and (iii) providing training on feeding management, feeding schedules and the effective use of feed resources to maximize production efficiency and minimize costs.
- Perform disease control and health management regarding the introduction and spread of diseases in pig farms, including by: (i) ensuring proper farm sanitation and quarantine procedures and controlling access to the farm; (ii) developing vaccination programs and treatment protocols, in collaboration with veterinary professionals, to control common pig diseases and ensure good health status; and (iii) train farmers, including women and youth, on early detection of diseases, proper diagnosis and appropriate treatment options to reduce mortality rates and improve overall herd health.

Investment cost of the piggery value chain

TABLE 21: INVESTMENT COST FOR PIGGERY DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|---------------------------------------|------------------|
| Improved breeding and genetics | 300 447 |
| Enhanced feeding and nutrition | 200 000 |
| Disease control and health management | 372 000 |
| TOTAL | 872 447.5 |

9.5. FISHERIES AND AQUACULTURE VALUE CHAIN

Expected outputs

- Number of fish farmers, including women and youth, increased by 40 percent annually from the current figure of 300 farmers to 1 050 farmers or more during the program phase
Volume of marine fisheries production increased by 40 percent, from approximately 28 000 t to approximately 35 200 t
- Number of ponds increased from 1 704 to 2 907 and area increased from 160 ha to 274 ha
- Number of fish products labelled and certified to meet export standards increased by 40 percent
- Percentage of post-harvest loss reduced from 40 percent to 10 percent
- Number of fishers increased from 13 000 to 18 200
- Number of processors increased from 18 000 to 25 200

Key strategic interventions

- Improve economic returns through the establishment of post-harvest infrastructure by: (i) establishing fish landing cluster in at least two additional counties, including Montserrado and Grand Bassa, to enhance earnings from industrial and artisanal fisheries; (ii) supporting artisanal fisheries to increase the value of fish by the provision of facilities for ice storage on artisanal craft; and (iii) supporting fish processors by the provision of modern fish drying equipment.
- Support national safety and quality assurance systems to enhance the safety and quality of fish by: (i) adopting, sensitizing and implementing a capacity building on hazard analysis and critical control points (HACCP) and total quality management (TQM); and (ii) enhancing the capacity of the National Fisheries and Aquaculture Authority for adoption of the Codex Alimentarius for fish standards, inspections and quality control of fish and fish products.
- Promote value addition through entrepreneurship, fish marketing and trade opportunities by: (i) supporting the packaging and developing fish products that add value to fish and fish products; (ii) promoting eco-labelling of targeted export-oriented fish to enhance the commercial value at international markets; (iii) certifying fish

products for the export market; and (iv) encouraging the establishment of value-addition enterprises and build capacity to meet international standards.

- Promote sustainable investment in fisheries and aquaculture by: (i) preparing and offering investors in fisheries incentives for identified ventures that are socially and environmentally sustainable; and (ii) promoting the development of credit and microcredit schemes to encourage investment in fisheries.
- Set up an enabling environment for the development of aquabusinesses for the growth of the sector by: (i) providing financial services and incentives for the promotion of smallholder aquaculture as a business, including for women and youth; (ii) ensuring the availability of and access to inputs, including fish seed and feed; (iii) supporting cost-effective aquaculture extension services to fish farmers, including women and youth, in collaboration with the private sector and farmer/industry organizations; (iv) establishing aquaculture research and technology development capabilities for the growth of the aquaculture sector through research centers such as CARI/Ministry of Agriculture; (v) building the capacities of private- and public-sector institutions to produce and disseminate good quality information on aquaculture for the facilitation of sound decision-making; (vi) improving access to markets for fish products by maintaining standards; (vii) promoting the safety and quality of farmed fish products by ensuring the application of safety and control mechanisms such as the HACCP methodology; and (viii) targeting women and youth in active involvement in aquaculture activities for the promotion of the subsector through support and empowerment programs.
- Implement comprehensive human resources development and training as well as advisory programs for the fisheries sector through: (i) preparing and implementing a plan to address human capacity needs; (ii) building capacity for new fisheries enterprises as well as alternative income-generation activities; and (iii) supporting and implementing a fisheries curriculum or syllabus at all stages of formal education.

Investment cost of the fisheries and aquaculture value chain

TABLE 22: INVESTMENT COST FOR FISHERIES AND AQUACULTURE DEVELOPMENT, USD

| COMPONENT/PRIORITY | COST |
|--------------------------------------|-------------------|
| Post-harvest infrastructure improved | 3 490 435 |
| Safety and quality assurance systems | 1 066 522 |
| Entrepreneurship | 1 163 478 |
| Investment | 1 163 478 |
| Aquaculture | 3 587 391 |
| Capacity development | 1 793 696 |
| TOTAL | 12 265 000 |

X. NADP CROSS-CUTTING PROGRAMS

10.1. MECHANIZATION WITH A FOCUS ON THE CREATION OF MECHANIZATION HUBS IN PRODUCTION CLUSTERS FOR BOTH PRODUCTION AND POST-HARVEST HANDLING

The agriculture sector in Liberia is plagued by low productivity, lack of access to modern farming technologies, high post-harvest losses and insufficient infrastructure. To overcome these issues and unleash the sector's full potential, it is essential to establish mechanization hubs in areas of high cultivation.

Crops such as rice, cassava, maize and vegetables are being heavily farmed in Liberia without the use of machinery or appropriate post-harvest management. The government plans to cultivate 20 000 ha of cassava, 20 000 ha of maize and 50 000 ha of rice during the next five years, along with other cash crops such as coffee and cocoa. To reach these milestones, mechanization hubs need to be established at which farmers can request machinery to continue cultivation operations in order to acquire high yields as a result of farm development and management.

To achieve the economic returns of various value chains and address food security, it would be necessary to strengthen and promote mechanization hubs in the sector. This will ensure sustainability and efficiency in the five years of the value chain intervention. The value chain system will become much more profitable, leading to the strengthening of gender mainstreaming, drawing young people into the system and ensuring a return on investment as income.

Expected outputs:

- Five mechanization hubs constructed, including buildings with storage facilities, workshop setups and maintenance areas and machinery and equipment such as tractors, harvesters, threshers, tilling and grading machines and packaging equipment.
- Reduced post-harvest losses: The establishment of mechanization hubs will help farmers learn and implement effective post-harvest management practices, leading to decreased crop losses for rice, cassava, maize and vegetables. As a result, farmers will be able to make better use of their harvested crops and see a boost in their profits.
- Increased productivity: Through the establishment of mechanization hubs, farmers will have access to modern farming technologies that will boost productivity in the agriculture sector. This is anticipated to result in a significant increase in yields per hectare as farmers can cultivate larger areas more efficiently.
- Strengthened gender mainstreaming and youth involvement: Automation centers will offer training programs for young people and women to become technicians who can operate and maintain machines. This will help promote gender equality, empower women and encourage more young individuals to take part in the agriculture industry, ensuring its longevity for generations to come.
- Promotion of public-private partnerships: By fostering collaborations between government and private entities, mechanization hubs will function as self-sustaining

enterprises. This joint effort will encourage funding, enhance financial accessibility and guarantee the hubs' lasting success.

- Market access and value addition: New technology centers will make it easier for farmers to connect with markets by creating central collection points. And with new processing facilities at these centers, farmers can boost the value of their crops, ultimately earning more money and spurring economic development in rural communities.

Key strategic interventions

Establishing a mechanization hub in the value chain systems of Liberia requires an intervention that promotes sustainability, usability, profitability and public–private partnership.

- Conduct a country agricultural production assessment to determine the optimal locations for establishing mechanization hubs based on the quantity and efficiency of crop production (highly productive district, county or region). Choosing a strategic location for the establishment of mechanization hubs – taking into account such factors such as porosity, accessibility, infrastructure and market demand requirements – can help enhance profit by effectively achieving the objectives of several value chains.
- Strengthen infrastructure development. To enable more farming communities to utilize it, the Ministry of Agriculture should fortify and broaden the progress it has made in one of its current programs, which encourages the construction of mechanization hubs. Making the intervention more resilient and sustainable requires constructing and fortifying workshops, storage spaces and rooms for maintaining machinery and equipment. Establish more needed mechanization hubs in achieving the targeted value chains objectives.
- Build capacity and training. Youth and women will be encouraged to work by being trained as technicians to run mechanization hubs, reducing poverty and increasing employment opportunities. Both value addition and food security will be supported and encouraged. Building the capacity of scientists, technologists and farmers will improve the sustainability of the hubs and enable them to adequately supply responsibilities to smallholders.
- Promote private- and public-sector partnership. Private and government partnerships should underpin the management and operation of the mechanization hubs. This will make it possible for the hubs to function as businesses, bolstering the private sector and drawing in capital. To encourage and expand public and private partnerships, the Ministry of Agriculture can take the lead and provide the conditions that are required to uphold justice and openness.
- Ensure access to finance intervention. The Ministry of Agriculture should facilitate and finance the construction of mechanization hubs in key value chain areas such as rice, cassava and maize through donor-funded agricultural initiatives, encouraging and assisting organizations that make finance more accessible throughout value chains and enabling nearby businesses, farmers' unions, cooperatives and smallholders to collaborate with hubs to fulfil the needs of their members and clients.

- Strengthen market linkages and value-addition intervention. Create market connections by setting up market aggregation centers at the hubs to help farmers find outlets for their produce. Encourage value-added processing methods as well. For example, establish centers for rice milling machines and cassava processing to which farmers may bring their raw materials to be processed and thus earn money.

Investments cost for the mechanization program

TABLE 23: INVESTMENT COST FOR MECHANIZATION PROGRAMS, USD

| COMPONENT/PRIORITY | COST |
|--|-------------------|
| Infrastructure: mechanization hubs | 2 175 000 |
| Procurement of machinery and equipment | 4 750 000 |
| Training and capacity building | 350 000 |
| Technology transfer | 1 500 000 |
| Market linkage | 1 500 000 |
| Monitoring and evaluation | 1 250 000 |
| TOTAL | 11 525 000 |

10.2. STRENGTHENING RESEARCH AND EXTENSION TO PROMOTE INNOVATIVE TECHNICAL APPROACHES

The agricultural research and extension capacities in Liberia are not adequately equipped to keep pace with the evolving demands of the agriculture sector. As a result, farmers lack access to cutting-edge agricultural technologies, innovative farming practices and up-to-date information that could significantly improve their productivity and livelihoods.

Addressing the challenges facing the agriculture sector in Liberia requires a comprehensive approach that encompasses both research and extension components. Strengthening research capacities will enhance the generation of scientific knowledge and innovative solutions tailored to the country’s agricultural context, while improving extension capacities will ensure that this knowledge is effectively disseminated and applied by farmers on the ground.

Expected outputs

- Establishment of specialized subresearch centers and extension offices in key agricultural counties to facilitate research and technology dissemination
- Increased collaboration between public and private stakeholders in agricultural research and extension activities
- Improved crop varieties, pest management strategies and sustainable farming practices developed and disseminated
- Capacity of farmers to adopt innovative technologies and practices through tailored extension services enhanced

- Increased productivity, resilience and sustainability of the agriculture sector in Liberia, leading to improved food security and livelihoods
- National fund for agricultural and agrifood research studied for implementation

Key strategic interventions

- Assess research needs. Conduct a comprehensive assessment of research needs across different agricultural subsectors, identifying priority areas for research and extension interventions based on the demands of farmers, market trends and national development goals. This assessment will guide the allocation of resources and the development of targeted research programs.
- Develop infrastructure. Enhance infrastructure for agricultural research and extension by upgrading research facilities, laboratories and extension offices.
- Improve access to technology and information through the establishment of digital platforms and communication networks. Strengthening infrastructure will facilitate knowledge sharing and capacity building among stakeholders.
- Build capacities and provide training (extension). Invest in training programs to build the capacities of agricultural researchers, extension agents and farmers. Provide training on innovative farming techniques, climate-smart agriculture and sustainable land management practices. Empower extension agents to effectively communicate research findings and provide tailored advice to farmers. Promote the involvement of youth and women in agricultural research and extension activities through specialized training programs.
- Promote public–private partnerships. Foster collaboration among government institutions, research organizations, academia and the private sector to promote knowledge exchange and technology transfer. Encourage private-sector investment in agricultural research and extension activities through incentives and partnerships. Develop joint research projects and extension programs to address common challenges and leverage resources effectively.
- Promote innovation and technology adoption. Create incentives for the adoption of innovative technologies and practices through research-driven extension services. Facilitate technology transfer and knowledge dissemination through demonstration plots, field days and farmer field schools. Encourage the development of locally adapted solutions and indigenous knowledge systems to address specific agricultural challenges. Establish demonstration farms for the promotion of technology adoption.
- Ensure adequate finance for agriculture research by establishing a national fund for agricultural and agrifood research.

Investment cost for strengthening the research and extension advisory service program

TABLE 24: INVESTMENT COST FOR STRENGTHENING RESEARCH AND EXTENSION ADVISORY SERVICES, USD

| COMPONENT/PRIORITY | COST |
|---|-------------------|
| Infrastructure development | 13 465 000 |
| Capacity building and training (extension) | 5 000 000 |
| Promotion of innovation and technology adoption | 9 450 000 |
| Promotion of public–private partnerships | 915 000 |
| TOTAL | 28 830 000 |

10.3. STRENGTHENING THE CAPACITY OF THE MINISTRY OF AGRICULTURE

The Ministry of Agriculture in Liberia serves as the cornerstone for ensuring food security, promoting sustainable agricultural practices and fostering rural development. However, it faces significant challenges that hinder its effectiveness in fulfilling these crucial roles. Limited financial resources, inadequate infrastructure and a scarcity of technical expertise impede the ministry’s ability to adequately support farmers and agricultural stakeholders nationwide. Without substantial capacity enhancement, the ministry struggles to ensure efficient and effective policies and project development, implementation, monitoring and evaluation and lacks the resource generation and utilization necessary to address emerging agricultural issues, thereby compromising the country’s overall agricultural productivity and resilience.

To address these challenges and fortify the capacity of the Ministry of Agriculture, concerted efforts are necessary to invest in human resources, infrastructure and training. This entails recruiting and training skilled personnel, upgrading Ministry of Agriculture facilities and equipment, and implementing digital solutions to streamline data collection and dissemination. Additionally, fostering partnerships with international organizations, research institutions and private-sector entities can facilitate knowledge exchange, resource mobilization and technology transfer, further augmenting the ministry’s capabilities. By prioritizing capacity-strengthening initiatives, the Ministry of Agriculture can better fulfil its mandate, empower farmers and contribute to sustainable agricultural development and food security objectives in Liberia.

Expected outputs:

- Skills and knowledge of 96 staff members enhanced
- All office facilities removed or improved
- Office equipment enhanced
- Ministry of Agriculture Project Management Unit capacities in monitoring and evaluation enhanced
- Collaboration with stakeholders on program implementation strengthened

Key strategic interventions

- Develop human resources. Enhance human resources skills and knowledge in agricultural policy development and the ministry's regulatory and oversight functions through comprehensive training and capacity building programs at all levels. This will enable them to provide more effective assistance to farmers, including women and youth and industry stakeholders, and play their role of control and regulation of the agriculture sector.
- Develop infrastructure. Upgrade the ministry's physical infrastructure (including offices, laboratories and storage facilities) to improve operational effectiveness and service delivery. The procurement of tools and technologies will further augment the ministry's operational capabilities.
- Strengthen policies and institutions. Establish robust institutional frameworks and policies to promote sustainable agriculture and rural development. Enhance the ministry's capacity in monitoring and evaluation by strengthening the management of the Ministry of Agriculture Project Management Unit, as this is essential for improved coordination and oversight of agricultural initiatives nationwide. Opportunities will be explored to collaborate with other relevant ministries regarding policy and programming to realize optimal impacts in the agrifood systems sector.
- Engage stakeholders. Foster strong alliances with farmers, civil society organizations and other stakeholders in the agriculture sector, including women and youth, to ensure successful program implementation. Enhancing the ministry's ability to engage with stakeholders will ensure their needs and objectives are effectively addressed.

TABLE 25: ESTIMATED COST TO STRENGTHEN THE CAPACITY OF THE MINISTRY OF AGRICULTURE IN USD

| Priority of strengthening capacities | Cost |
|--|------------------|
| Human resources development and capacity building for policy implementation | 1 300 000 |
| Workshops and seminars | 200 000 |
| Infrastructure development and renovation and improvement of office facilities | 3 475 000 |
| Procurement of equipment and technology | 2 850 000 |
| Policy and institutional strengthening | 600 000 |
| Stakeholder engagement and collaboration on program implementation | 360 000 |
| TOTAL | 8 785 000 |

10.4. DEVELOPING INCLUSIVE AGRIBUSINESS MODELS FOR THE INTEGRATION OF SMALLHOLDERS INTO AGRIFOOD VALUE CHAINS

Inclusive business models promote the integration of smallholders into markets, with the underlying principle that there are mutual benefits for poor farmers and the business community. An inclusive business model approach reinforces the value chain by focusing exclusively on strengthening business models that link small farmers to value chains. Smallholder business models include traders, farmers' organizations, agrifood processors and large buyers. The range of business models that make up an agricultural value chain includes farm enterprises, traders, agro-processors, wholesalers, transporters, warehouses and retailers, among others.

The government will support inclusive agribusiness models so that developments in agriculture help address the needs of vulnerable groups and contribute to poverty reduction and food security. Reasons for applying an inclusive business model include raising smallholders' incomes, mainstreaming modern business and market-oriented production skills, involving the private sector in national development goals, and improving food security through the commercialization of food and cash crops.

Expected outputs

The government will promote agribusiness models that:

- provide a living wage to vulnerable groups (such as small farmers, women and young people working for an enterprise or supplying a buyer) while also enabling the buyer to remain competitive;
- promote agricultural entrepreneurship and enterprise development in the targeted agrifood value chain;
- use flexible trading arrangements that make it easier for small farmers or enterprises to supply a buyer;
- support farmers and small enterprises in establishing a stronger negotiation position through skills development, collective bargaining and access to market information and financial services;
- build on the skills and expertise of existing market players, including traders and processors, and promote collaboration, transparent pricing mechanisms and risk sharing;
- are scalable so that more people can benefit and/or the business model can be replicated in other value chains;
- allow diverse business models, in order to enable the rest of the sector to benefit from upgraded skills and technologies and to avoid overdependence on single buyers;
- support 2 000 young people and women in 200 microenterprises involved in the manufacture of organic fertilizers and biopesticides;
- support the establishment of integrated market-gardening/fruit-growing perimeters by supplying farming equipment (tractors, storage warehouses, air dryers, inputs), with the program supporting the creation of 950 microenterprises covering 9 500 young people and women;

- support the setting up of youth microenterprises to process and distribute cereal and vegetable products through the development of local packaging and processing capacity to extend storage life and manage seasonal oversupply, with the program supporting the establishment of 50 local packing houses and 50 processing units within the framework of a collective financing and management mechanism;
- promote improved sheepfolds for youth and women, with 15 000 improved sheepfolds set up to meet technical standards, having a capacity of 30 head and including different compartments to provide areas for breeding, kidding and finishing;
- support the setting up of improved collective and family poultry production units, supporting 10 000 young people and women in setting up improved collective and family poultry production units and training 300 associate professionals in poultry farm management; and
- improve women's and young people's employability in the conservation, processing and marketing of fishery and aquaculture products, including through the setting up of small pilot units to add value to fish products to help women diversify their products and the construction and equipping of modern artisanal processing units, supported as planned and budgeted in fisheries value chain.

Key strategic interventions

- **Combine investments in smallholder agriculture with policies on the role of cooperatives in value chains**

The main challenges facing small farmers and enterprises are well known and documented. They include low and fragmented production, lack of access to extension services and finance, and weak marketing capacity. In response to these challenges, the Ministry of Agriculture will: (i) target the intensification of production combined with the reorientation of farmers from subsistence farming to market-oriented “farming as a business”; and (ii) support farmer organizations and improve the provision of market-oriented services for their members.

The overarching objectives of these “on- and close-to-farm” interventions remain critical for addressing local market constraints and scaling up inclusive business models. This type of targeted support is more likely to be scalable if policies supporting agricultural cooperatives are clearly formulated and broadly disseminated among major stakeholders.

Rwanda is an example of a country in which clear policies strengthen the role of cooperatives and are widely understood. The National Policy on the Promotion of Cooperatives, the Rwanda Cooperative Agency and a growing cooperative movement have contributed to the successful implementation of land consolidation and crop intensification programs. This success has resulted in the tripling of production between 2008 and 2012 for crops such as maize and beans.

- **Promote agricultural entrepreneurship and enterprise development in the targeted agrifood value chains**

Promoting inclusive agribusiness development in the country will require broad value chain development, including several strategic interventions that provide the necessary ecosystem for agribusinesses to thrive, be profitable, provide employment and contribute to food and nutrition security. The model should foster investment in agricultural entrepreneurship (agripreneurship) and enterprise development for smallholders (notably SMEs) along the value chain, based on market demand and viable business plans promoted by organizations and/or individuals. It should help smallholders shift from a subsistence to market-oriented, nature-conservative, nutrition-sensitive and resilient agriculture in the context of climate change. This can be achieved through the following actions:

- Strengthen the organization of smallholders in a way that they form an entity for improved value chain coordination and bargaining power.
- Reduce the cost and risk of doing business with smallholders, building on proven best practices.
- Support access to affordable and smallholder-friendly financial services for agripreneurship.
- Promote agribusiness incubation in the country through the development of enterprise support organizations, namely agribusiness incubators and accelerators,¹ to support smallholder-led business development in priority value chains, as organizations or individual entrepreneurs.
- Support the creation/strengthening of enterprises (SMEs) along the value chain in production, processing, storage and marketing.
- Identify and support market opportunities for healthy and nutritious food at national and subregional levels, particularly for SMEs.
- Promote connections with identified markets at national, subregional and international levels by establishing direct links with buyers.
- Foster market access to smallholders' businesses by promoting homegrown school feeding businesses through public–private partnerships.
- Support capacity building for government institutions, service providers and smallholders (individuals, organizations and SMEs) to strengthen enterprise development in the targeted value chains, including: training on the sustainable food value chain approach and tools through rapid and appropriate value chain analysis and business modelling (EX-ACT for value chains, Rural Invest); training and technical assistance on strategic planning tools, economic and financial analysis, sustainability, innovative financing and digital agriculture tools for increased accessibility to business and financial services and risk management tools for value chain actors; technical training on technologies and good production, manufacturing and hygiene practices; entrepreneurial training, management, marketing and

¹ See definitions and concepts in FAO. 2023. *Agribusiness incubation and acceleration landscape in Africa – Role of agribusiness incubation in promoting agricultural entrepreneurship and enterprise development*. Rome. <https://doi.org/10.4060/cc5763en>

integration into the business world; training on export market standards and requirements; training in contract management and logistics; training and coaching on marketing and brand image; and training on formalization, quality, certification and access to services and funding, incubation management and coaching.

- Draw up and implement a support plan for women and young agripreneurs benefiting from training and incubation in self-employment or entrepreneurship in the targeted value chains.

- **Strengthen the capacities of buyers to improve the reliability of demand for smallholders' produce**

To ensure the development of coordinated and efficient smallholder business models, it is also important to strengthen the reliability of demand from buyers. Small traders and artisanal processors are often the only market outlets for smallholders, particularly in the value chains for staple foods such as cassava and rice. These buyers are typically small and fragmented, with weak business skills and limited access to finance and inputs for their enterprises. These characteristics have negative impacts on the reliability of market access for smallholders.

In addition to providing support to farmer organizations, demand also can be strengthened by building the institutional capacity of traders and artisanal food processors' associations.

The demand side of the chain also can be strengthened by engaging existing buyers in the delivery of projects and programs for smallholder value chains. For example, under its Crop Intensification Program, the Ministry of Agriculture of Rwanda contracts large traders and agrodealers to distribute fertilizer and train farmers on its application. This approach has contributed to the transfer of knowledge among value chain actors, better coordination in supply and demand, and an approach led by the private sector for the development of smallholder value chains.

- **Ensure all value chain actors are fairly represented in public–private partnerships and on commodity associations or value chain committees**

Public–private partnerships are potential mechanisms for developing inclusive business models in agricultural value chains. They can be used to link large numbers of smallholders to the industrial sector. The goal of public–private partnerships is to achieve the objectives of both the public and the private sectors. To justify public-sector investment, clear benefits for the general public are needed, such as poverty reduction, food security and overall agro-industrial growth.

Intermediaries can screen public–private partnership proposals, monitor and evaluate their implementation, and engage in dispute resolution and reporting. An example of a public–private partnership that promotes inclusive business models is the Agribusiness Innovation Fund run by the Agricultural Sector Coordination Unit in Kenya. Value chain round tables and commodity associations also are useful vehicles for bringing together the public and private sectors to discuss concerns. They can address areas such

as arbitration and regulation, advising on technical norms such as grades and food safety standards, research priorities and attracting investment.

To ensure the inclusiveness and sustainability of these initiatives, all groups need to be fairly represented in discussions, including associations representing small farmers, traders and processors.

- **Adapt lessons and tools from the development of high-value crop chains and apply them to staple crop chains**

Public and private-sector support to smallholders' integration into value chains has traditionally prioritized cash crops and high-value crops. This priority has changed since the food crisis of 2008, and there is now more strategic emphasis on the commercialization of staple food crops such as rice, maize and cassava. This approach has been validated by the growing demand for locally produced, fresh and processed food for domestic urban markets, driven by rapid urbanization and population growth in developing countries. Many lessons and tools used to support cash and high-value crops can be adapted to staple crop value chains. However, approaches need to be tailored to the different commodity structures.

- **The government may also consider the following longer-term policy implications:**

The role of interministerial strategic planning and implementation: Different aspects of the strategic interventions fall under the mandates of different ministries. Productivity falls under the mandate of the Ministry of Agriculture, while laws governing cooperatives, traders and processors fall under the Ministry of Trade. A separate ministry will deal with food security and nutrition, while the Ministry of Finance will deal with investment in agriculture. Initiatives promoting inclusive business models, therefore, relate to lines of responsibility in several ministries.

The need for balanced engagement by the public and private sectors: Inclusive business models require the balanced engagement of the public and private sectors to ensure that growth in the agriculture sector leads to poverty alleviation. Models driven by either the public or the private sector can result in poorly coordinated markets or further market exclusion for vulnerable groups. Promoting value chain platforms and public-private partnerships provide useful mechanisms for incorporating the interests of both the private and the public sectors into inclusive business model initiatives.

The importance of a modern agricultural education system for the rejuvenation of the sector:

There is an urgent need to rejuvenate the agriculture sector so that young people can participate in the development of inclusive business models. National education systems are instrumental, but agricultural courses need to be modernized to make them more attractive to young people and relevant to the needs of agribusinesses. This requires strategic interministerial planning, involving the ministries of agriculture, education and trade along with representatives of tertiary and secondary institutes, farmers' organizations and agro-industry.

The Ministry of Agriculture will design typical farm models according to types of speculation and ecological zone to guide investors in the sector. Special incentives will be made available to all those wishing to invest in this form of agribusiness. The Ministry of Agriculture will ensure quality control of these farms.

The Ministry of Agriculture will support:

- capacity building to enhance the employability and sustainable entrepreneurship of young agripreneurs in agricultural and fisheries value chains;
- the development of entrepreneurial capacities to empower young people and women to manage their agribusinesses; and
- improvements to young entrepreneurs' access to financial and non-financial services.

Capacity building to enhance the employability and sustainable entrepreneurship of young agripreneurs in the agriculture and fisheries value chains:

- Setting up/strengthening small businesses to produce goods and services

Microenterprises producing organic fertilizers: The program will support 2 000 young people and women in 200 microenterprises involved in the manufacture of organic fertilizers and biopesticides.

Capacity building will be carried out, and new organic fertilizer techniques based on locally available products will be developed. The young people and women who are trained will receive material and equipment support as well as a grant for the acquisition of primary inputs.

The creation/promotion of microbusinesses manufacturing and repairing agricultural materials and equipment will be carried out by 2 000 young people trained at technical training centers who have been awarded certified qualifications.

- Setting up youth microenterprises to produce fruit seeds and seedlings.

The aim of this activity is to set up a modern, competitive and sustainable seed industry, backed by research institutions and agricultural skills, for the production of quality seeds and seedlings. These microbusinesses will be located in intensive fruit production zones.

- Support for the creation of youth microenterprises in horticultural production through the establishment of modern orchards by facilitating access to land, with particular support given to local authorities to define a local strategy for access to land for young people and women, and by supporting the establishment of integrated market-gardening/fruit-growing perimeters by supplying farming equipment (tractors, storage warehouses, air dryers, inputs). The program will support the creation of 950 microenterprises covering 9 500 young people and women.
- Support for setting up youth microenterprises to process and distribute cereal and vegetable products through the development of local packaging and processing capacity to extend storage life and manage seasonal oversupply. The program will support the

establishment of 50 local packing houses and 50 processing units within the framework of a collective financing and management mechanism.

- Promotion of improved sheepfolds for youth and women, with 15 000 improved sheepfolds set up to meet technical standards. These sheepfolds will have a capacity of 30 head and will include different compartments to provide areas for breeding, kidding and finishing.
- Support for the setting up of improved collective and family poultry production units, with 10 000 young people and women supported in setting up the units and 300 associate professionals trained in poultry farm management.
- Improve women's and young people's employability in the conservation, processing and marketing of fishery and aquaculture products. Small pilot units to add value to fish products will be set up to help women diversify their products. The construction and equipping of modern artisanal processing units will be supported as planned and budgeted in the fisheries value chain, along with storage and conservation conditions for fishery and aquaculture products through the cold chain, as planned and budgeted in fisheries value chain.

The Ministry of Agriculture will help young people and women gain easy access to the financial resources of the Agriculture Enterprise Development Bank (AEDB) to be set up under NADP.

TABLE 26: ESTIMATED COST TO DEVELOP INCLUSIVE AGRIBUSINESS MODELS FOR THE INTEGRATION OF SMALLHOLDERS INTO AGRIFOOD VALUE CHAINS, USD

| PRIORITY | COST |
|---|------------------|
| Support farmer organizations in improving the provision of market-oriented services for their members | 500 000 |
| Improve and broadly disseminate policies supporting agricultural cooperatives | 500 000 |
| Build the institutional capacity of traders and artisanal food processors' associations | 800 000 |
| Support interministerial strategic planning and implementation | 200 000 |
| Build capacity to enhance the employability and sustainable entrepreneurship of young and women in agribusiness | 2 000 000 |
| Rejuvenate the agriculture sector so that young people can participate in the development of inclusive business models | 500 000 |
| TOTAL | 4 500 000 |
| Access to finance to set up youth and women agrobusiness will be done through the AEDB, which is already budgeted in the NADP | For the record |

10.5. ACCESS TO FINANCE THROUGH the ESTABLISHMENT OF THE AGRICULTURE ENTERPRISE DEVELOPMENT BANK

Access to finance through establishment of the AEDB is an important dimension of the agricultural economy in Liberia for a number of reasons, including:

- Access to finance. Farmers, particularly smallholders, often find it difficult to access traditional financial services due to their unstable incomes, the seasonal nature of their businesses and the lack of sufficient collateral. A national agricultural bank can provide financial services tailored to the specific needs of the agriculture sector, such as agricultural loans at affordable interest rates, adapted savings products and agricultural insurance.
- Promotion of agricultural investment. The AEDB will play a key role in promoting investment in the agriculture sector by offering attractive financial products to farmers and agricultural enterprises. This can help boost agricultural productivity, modernize farms and increase farmers' incomes.
- Rural poverty reduction. By providing easier access to financial services, the AEDB will help reduce rural poverty by enabling farmers to invest in their businesses and production methods and increase their incomes. This will help boost food security and stimulate economic development in rural areas.
- Agricultural risk management. Farmers are exposed to a variety of risks, such as weather hazards, crop disease and fluctuating commodity prices. The AEDB will offer tailored agricultural insurance products to help farmers manage these risks and protect their livelihoods.
- Sustainable development. By supporting sustainable agricultural development, the AEDB will encourage the adoption of environmentally friendly farming practices, the promotion of organic farming and the conservation of natural resources.

Expected outputs

- A feasibility study has been carried out to enable the government to make the necessary decisions for the implementation of the AEDB.
- An estimated investment of USD 40 million has been raised to set up the AEDB under a public-private partnership.

Key strategic interventions

- Assess feasibility. Before setting up the AEDB, it is essential that the government to carry out a thorough feasibility study to assess the viability of the project. This study should analyse the demand for agricultural financial services, identify farmers' needs, assess the existing financial market and determine the resources required.
- Establish a legal and regulatory framework. The minister in charge of finance will establish a sound legal and regulatory framework for the creation and operation of the AEDB. This includes defining the organizational structure, objectives, policies and procedures and compliance with applicable banking laws and financial regulations.

- Ensure capitalization. Setting up the AEDB will require adequate startup capital to guarantee its solvency and its ability to meet farmers' financing needs. This may involve mobilizing public funds, public-private partnerships or foreign investment.
- Recruit and train staff. It is essential to recruit and train highly qualified staff specialized in banking and agriculture to ensure the smooth operation of the national agricultural bank. Staff should have a good knowledge of agricultural practices, financial management and banking services.
- Develop adapted financial products. The AEDB should develop financial products adapted to the specific needs of farmers, such as agricultural loans at affordable interest rates, savings and credit services, agricultural insurance, etc.
- Establish partnerships and networking. It is important to establish strategic partnerships with other players in the agriculture sector, such as agricultural cooperatives, farmers' organizations, development agencies, research institutions, etc. These partnerships can strengthen the capacity of the national agricultural bank and broaden its impact.
- Raise the investment amount needed. The Ministry of Agriculture, in close collaboration with the Minister of Finance, the private agriculture sector, technical and financial partners and banks, will mobilize an investment of USD 40 million to effectively set up the AEDB.

Investment cost for the Agriculture Enterprise Development Bank

TABLE 26: INVESTMENT COST FOR ESTABLISHING THE AGRICULTURE ENTERPRISE DEVELOPMENT BANK, USD

| COMPONENT/PRIORITY | COST |
|------------------------------------|-------------------|
| Carry out a feasibility study | 300 000 |
| Raise the investment amount needed | 40 000 000 |
| TOTAL | 40 300 000 |

XI. NADP FUNDING PLAN AND RESOURCE MOBILIZATION

11.1. NADP FUNDING PLAN

TABLE 27: FINANCING PLAN FOR NADP FUNDING

| Program | Government funding (%) | Financial partner funding (%) | Private sector funding (%) | Farmers' organization funding (%) |
|------------------------|-------------------------------|--------------------------------------|-----------------------------------|--|
| Value chain | 30% | 45% | 20% | 5% |
| Cross-cutting programs | 60% | 40% | 0 | 0 |

11.2. NADP RESOURCE MOBILIZATION

The NADP fundraising strategy consists of the following steps:

1. Identify the funding for ongoing projects and those in the pipeline and deduct them from the overall NADP amount. This will determine the funding gap to be presented to the funding round table or business meeting, which will regroup government, international donors, the private sector and the FAO Representative.
2. Prepare a NADP implementation plan, which will identify:
 - short-term programs (2024-2026)
 - medium-term programs (2026–2028)
 - long-term programs (2028 and beyond)

XII. NADP RESULTS FRAMEWORK 2024–2029

The NADP has developed and defined specific results frameworks for each value chain, covering all the sectoral indicators to be monitored and evaluated throughout the implementation of the NADP.

The NADP indicators linked to the National Agriculture Development Agenda (NADA) focus on the levels of structural transformation of the agriculture sector as a driver of the national economy, as well as its overall impact on food security and the sustainability of development. The indicators selected are set out in Table 28.

XIII. KEY IMPACT INDICATORS

TABLE 28: KEY IMPACT INDICATORS

| OBJECTIVE | IMPACT INDICATORS |
|--------------------------------|---|
| Driver of the national economy | <ul style="list-style-type: none">- Growth in the agriculture sector's contribution to the GDP- Growth in agricultural GDP- Volumes and rates of public and private investment in the sector- Agricultural employment and income- Change in youth employment rate |
| Food and nutrition security | <ul style="list-style-type: none">- Nutritional quality compared with international standards- Malnutrition rates by sex and age- Change in consumer food prices (HICP) |
| Environment and biodiversity | <ul style="list-style-type: none">- Environmental impact indicators- Proportion of land supporting biodiversity |

The results framework for each value chain is detailed in the attached detailed value chain document.

XIV. RISKS AND MITIGATION

THE NADP is subject to many risk factors that must be identified, and mitigation measures rolled out (Table 29). Some of the risk factors include the following:

- Untimely release of funds (by the Government of Liberia and development partners) for value chain program implementation
- Unresponsiveness of private-sector actors and/or international partners to available investment
- Limited human resource and institutional capacity (systems, skills and expertise) to support project implementation
- Negative impacts of climate variability on expected project results

TABLE 29: RISKS AND MITIGATION

| Potential risk | Risk levels | Probable consequences | Mitigation measures |
|---|--------------------|--|--|
| Delayed disbursement of funds by the government and development partners to implement the value chain program | Medium | Delays in NADP implementation and desired results | - Disseminate timelines for disbursement of value chain program funds and ensure timely release |
| Lack of commitment from private-sector players and/or international partners to the investments planned in the NADP | Medium | Low private-sector investment Low production, productivity and food and nutrition insecurity | - Understand and address their challenges - Create a conducive environment for agriculture business development - Sensitize actors through workshops on business opportunities |
| Limited human resources and institutional capacity (systems, skills and expertise) to support the NADP implementation | Medium | Weak ability to formulate, implement, monitor, evaluate, coordinate, and supervise the NADP implementation | - Undertake organizational capacity assessment - Provide appropriate and targeted capacity building to Ministry of Agriculture, CARI, extension system and farmers' organization |

| | | | |
|---|--------|---|--|
| | | | - Utilize consultants in critical situations |
| Negative impacts of climate change on the implementation of the NADP programs | Medium | Decreasing production Reducing biodiversity and soil fertility | - Adopt climate-smart agricultural practices - Provide technical support to smallholder farmers - Strengthen emergency and disaster risk reduction management system |

XV. THE IMPLEMENTATION ARRANGEMENTS PLAN

15.1. National Agriculture Steering Committee

This committee is headed by H.E. the President of the Republic of Liberia and includes the heads of line ministries, agencies and commissions. It is the highest decision-making body for the NADP. The pivotal role of the committee is to exercise oversight responsibility and create conditions suitable for the sector's growth and development.

The terms of reference of the committee include, but are not limited to, the following: (i) ensuring an enabling environment that attracts private investment for improved production and productivity, accelerated value addition, and enhanced marketing of agriculture commodities and its derivatives; (ii) hosting an annual forum for stakeholders' dialogue to review the sector's performance and seek joint sectoral solutions to critical challenges impacting the agriculture sector's performance; and (iii) establishing action points for the advancement of the sector. The NASC shall meet once a year, with the minister of agriculture serving as secretary.

15.2. National Implementation Coordination Committee

The Ministry of Agriculture, with its overall responsibility for implementing the NADP, recognizes the crucial role of the National Implementation Coordination Committee (NICC). This committee, headed by the Minister of Agriculture, will exercise strategic oversight of the NADP. Comprising representatives of relevant government institutions, the private sector and non-state actors, the NICC will make decisions and take actions that will significantly impact the plan's success. The committee will meet twice a year, with the possibility of an extraordinary meeting depending on the situation and approved by two-thirds of the membership. The entities involved in the plan's implementation are: (i) the Ministry of Agriculture for the leadership role; ii) the Ministry of Commerce and Industry for activities focused on connecting producers to traders and processors and supporting standardization, quality control and certification; (iii) the Ministry of Finance and Development Planning to carry out project activities related to policy coordination among ministries and agencies; (iv)

the Corporative Development Agency for project activities designed to strengthen capacity (cooperative leadership, governance, etc.) of farmer-based organizations and cooperatives; and v) CARI and tertiary institutions for research and support for technology transfer, the private sector for driving investment in the value chain, and non-state actors as financial and technical international partners and a “pressure group” ensuring commitments by all parties to the plan’s implementation partnership.

Terms of reference: The NICC will perform a management role, skillfully guiding the plan’s implementation towards attaining the desired outcome and impact. Its tasks will include, but are not limited to: i) ensuring the plan’s implementation complies with the NASC’s established rules and regulations; ii) motivating partnering institutions to perform their respective roles; iii) ensuring the conduct of regular plan implementation support by the NASC, with a focus on the coordination, supervision, monitoring and evaluation of the plan; iv) reviewing to adjust the annual plan implementation progress reports and submit same to the NASC; and v) supporting the NASC in resource mobilization efforts.

The Ministry of Agriculture will execute the NADP under the direct supervision of the deputy minister for planning and development. He will be supported by the Ministry of Agriculture’s monitoring and evaluation specialist, procurement specialist and financial management specialist and the internal audit unit.

XVI. COMMUNICATION STRATEGY

Communication is the core of any professional program, including agriculture. Part of the many challenges besetting agriculture in Liberia includes communication, especially as communication nowadays transcends traditional media (radio, newspaper and television). It is crucial for luring investment through the private sector, marketing produce and products and attracting the involvement of women, youth and vulnerable people. Similarly, this communication strategy is designed to effectively guide all activities related to internal and external communications capable of marketing the National Agriculture Development Plan (NADP) 2024–2030 and supporting the implementation of agriculture interventions, thereby achieving the results sought by the NADP.

Objectives of the communication strategy

- Provide and lead meaningful guidance on how the communication and knowledge products for the NADP and the agriculture sector are generated, managed and disseminated
- Enable the development of impactful communication materials, ensure the advocacy and messaging reach relevant audiences, and at the same time ensure the transparency of the agriculture sector’s coordination, governance processes and implementation
- Raise awareness and appreciation of remarkable investments, interventions and achievements in the agriculture sector and commodities subsectors
- Promote the High Conservation Value and organic profiles as tools for identifying, managing and monitoring critical values in the natural and production landscape

Expected outputs

- Enhanced strategic partnerships and effective communication related to the agriculture potential in Liberia

Strategic interventions

- Increase media access and engagement. (i) Foster, manage and sustain partnerships with local media channels (print, broadcast, television and social media) through relevant programs (workshops and meetings) and news stories to ensure the wider reach of the NADP. (ii) Organize media trips and visits to major agriculture production sites and interactions with local communities, farmers, producers and agribusinesses. (iii) The Ministry of Agriculture will also make use of its social media channels and expand to other popular social media. (iv) Upload appropriate content for raising awareness and garnering support from various stakeholders and partners.
- Improve private-sector ownership. (i) The Ministry of Agriculture will adopt effective and appropriate communications systems and processes. (ii) Increase the understanding of the deliverables and requirements of the agriculture sector in Liberia. (iii) Strengthen strategic partnerships and improve private-sector ownership of agriculture investment.
- Enhance the institutional capacity of the Ministry of Agriculture in communication. The Ministry of Agriculture will facilitate, along with implementing partners and other development partners, the building of capacity within the Ministry of Agriculture, CARI, Corporative Development Agency, National Fisheries and Aquaculture Authority and LACRA communications team.
- Develop and promote appropriate and effective communication products, systems and processes: (i) The Ministry of Agriculture will rebrand and facilitate all of its parastatals to rebrand its webpage dedicated to promoting the NADP and the Liberia agriculture potential on its website. (ii) The Ministry of Agriculture will facilitate and encourage the National Investment Commission, the Ministry of Foreign Affairs and different Liberian embassies, and the Ministry of Information, Culture Affairs and Tourism to promote the agriculture potential of Liberia. (iii) Share basic agriculture potential and investment information, including data and lessons learned, through websites. (iv) Develop impactful communication materials and agriculture investment products to reach audiences at all levels. (v) The Ministry of Agriculture will advocate for a declaration by the president that every Thursday will be a day to wear and promote agriculture investment in Liberia paraphernalia. (v) The Ministry of Agriculture, along with its parastatals, will facilitate and mandate its staff to always wear promotional paraphernalia at all events at home and abroad as well as include the slogan in the official email signature of every staff member.
- Develop a crisis communications plan. (i) Provide guidance and ensure that proper mechanisms are put in place to respond and communicate during human-caused or natural crises capable of affecting the agriculture sector and investment. (ii) Solicit regular feedback through surveys, feedback forms, hotlines, help desks, online forums and discussion groups.

Estimated cost to implement the communication strategy of the NADP

TABLE 30: BUDGETED ESTIMATE OF THE COMMUNICATION STRATEGY, USD

| COMPONENT/ACTIVITY | COST |
|---|----------------|
| Component 1: Increase media access and engagement | 282 000 |
| Component 2: Improve private-sector ownership | 210 000 |
| Component 3: Develop and promote appropriate and effective communication products | 300 000 |
| Component 4: Crisis communications plan | 47 000 |
| TOTAL | 839 000 |

XVII. APPENDIX

All these documents are attached to the Annex for more details:

- I. Food crop value chain programs
 - Rice
 - Cassava
 - Maize
 - Vegetables
- II. Cash crop value chain programs
 - Cocoa
 - Coffee
 - Cashews
 - Coconuts
 - Rubber
- III. Fruit crops
 - Papayas
 - Avocados
 - Mangoes
 - Citrus
 - Bananas
- IV. Livestock
 - Cattle
 - Goats and sheep
 - Poultry
 - Pigs
- V. Fisheries and aquaculture
- VI. Cross-cutting programs
 - Mechanization with a focus on the creation of mechanization hubs in production clusters for both production and post-harvest handling
 - Strengthening agricultural research and extension capacities to promote innovative technical approaches
 - Access to finance through the establishment of the Agriculture Enterprise Development Bank
 - Developing inclusive agribusiness models for the integration of smallholders into agrifood value chains
- VII. Communication strategy

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**CHAPTER ONE: FOOD CROPS VALUE CHAIN
PROGRAMS**

XVIII. RICE VALUE CHAIN

18.1. CONTEXT

Liberia has one of the highest per capita consumption rates of rice in Africa, with individuals consuming approximately 133 kg of rice per year. This high consumption rate indicates the cultural significance and dietary importance of rice in Liberian society. Despite efforts to promote local rice production, Liberia still imports a significant amount of rice to meet domestic demand. The country imports nearly 300,000 metric tons of rice annually, costing around US\$200 million. This reliance on imports affects food security and economic stability.

Despite facing significant challenges in the agricultural sector, Liberia has the potential to increase its rice productivity and efficiency. While the demand for rice remains high due to demographic trends, economic growth, and cultural preferences, the country currently produces only one-third of its rice needs. However, this presents a huge opportunity for investment in the sector and improvement of farming practices, access to technology, and infrastructure to enable Liberia to increase its domestic rice production, which will help to reduce food insecurity, poverty, and vulnerabilities in the country. Furthermore, with the right policy actions and investments, Liberia has the potential to triple its rice production and meet local demand, while also boosting economic growth and development.

The social context: In Liberia, women involved in the rice value chain face multiple challenges, including social norms and gender roles that often limit their access to vital resources such as land, credit, and extension services. These challenges, in turn, restrict women's ability to participate fully in decision-making processes related to rice production and marketing.

The strict gender norms that dictate what women and men are supposed to do also hinder women's involvement in the rice value chain. Social norms often reinforce the idea that women should focus on domestic chores and leave agricultural production to men. This gender disparity perpetuates an unequal distribution of resources, opportunities, and benefits in the rice value chain.

To advance agricultural production in Liberia, it is crucial to change these social norms and gender roles. This change will enable women to participate fully in the rice value chain, making vital contributions to the industry. Empowering women to take on decision-making roles in rice production and marketing will lead to more equitable and sustainable outcomes for all involved.

Furthermore, the youthful population of Liberia presents an opportunity for growth and innovation in the rice value chain, but there are significant challenges that must be addressed to fully harness this potential. Improving access to education and vocational training, enhancing financial inclusion, investing in infrastructure development, and providing targeted support for young entrepreneurs are crucial steps towards overcoming the employment challenges facing young people in Liberia's rice value chain.

The institutional context of the rice value chain in Liberia is crucial for understanding how rice production, distribution, and consumption are organized within the country. In Liberia, the rice

value chain involves various institutions at different stages, from production to consumption. These institutions play key roles in shaping the dynamics of the rice market and ensuring food security for the population.

Table 31: The rice value chain structuring, different institutional players (strengths and weaknesses)

| Institution | Strength | Weakness |
|--------------------------------|--|---|
| Government institutions | Government institutions play a significant role in setting policies, regulations, and providing support to enhance the rice value chain | limited resources, bureaucratic inefficiencies, and sometimes lack of coordination among different agencies involved in the rice value chain |
| Farmers' Cooperatives | Farmers' cooperatives can empower small-scale farmers by providing access to inputs, training, and collective marketing opportunities. These cooperatives can help improve farmers' bargaining power and increase their productivity | limited access to finance, inadequate infrastructure, and sometimes issues related to governance and management |
| Private Sector Entities | Private sector entities such as agribusinesses and rice millers play a crucial role in adding value to rice through processing and marketing. They can bring innovation, technology, and investment into the rice value chain | Challenges for private sector entities may include market volatility, access to finance, infrastructure constraints, and sometimes competition with imported rice products |
| Research Institution | Research institutions contribute to improving agricultural practices, developing new varieties of rice, and providing technical assistance to farmers and supporting innovations in the rice value chain | limitations in terms of funding, capacity building, and translating research findings into practical applications for farmers |
| Development Partners | Development partners such as international organizations or NGOs provide funding, technical assistance, and capacity-building support to strengthen the rice value chain in Liberia | However, challenges may arise related to sustainability of projects, alignment with national priorities, coordination with other stakeholders, and potential dependency on external aid |

The Government of Liberia has shown an unwavering commitment to boosting the rice value chains in the country by making appropriate investments and identifying key areas such as infrastructure development, policy support, capacity building, and research initiatives to achieve its goals.

The government's focus on infrastructure development is aimed at improving the transportation and storage facilities for rice, which will help reduce post-harvest losses. Additionally, the investment in policy support will provide a conducive environment for farmers, traders, and other stakeholders in the rice value chains to thrive.

Capacity building is another key area that the government is investing in to enhance the skills and knowledge of farmers, processors, and other key players in the rice value chains. This is expected to lead to improved productivity and quality of rice, which will attract better prices in the market, thereby increasing the income of farmers.

Furthermore, the government is also investing in research initiatives to address some of the challenges facing the rice value chains in the country. This includes developing new rice varieties that are more resistant to pests and diseases, as well as educating farmers on best practices for rice cultivation.

18.2. JUSTIFICATION OF THE RICE VALUE CHAIN

The rice value chain in Liberia is fragmented, and most rice cultivation is for subsistence purposes. Rice producers and millers experience significant disincentives to increase investment and production, primarily due to high transportation costs, impeding their competition with imported rice. Despite the marginal increase in Liberia's rice production from 296,090 MT to 309,144 MT in 2010-2016, average yield grew from 1.2 to 1.3 MT/Ha within the same timeframe (FAOSTAT 2019). Rice is produced under slash-and-burn shifting cultivation systems, predominantly in the uplands and some lowland regions. Households mainly process most of the rice using simple technology.

Rice is, for the most part, a subsistence crop, with only 7 to 21% of domestically grown rice sold in the market (World Bank 2019). Women play a crucial role in rice cultivation, with more than 50% of the agricultural workforce being female. Additionally, 79% of cultivated land per household is operated by female-headed households (LISGIS 2018a).

Around 309,144 MT of rice are annually produced (FAOSTAT 2019), while 364,000 MT (as calculated by rice task force) have to be imported every year to meet national demand. The import bill rose from 76.8 million USD in 2010 to 217.5 million USD in 2017 (Ministry of Commerce and Industry (MOCI, 2017). As only 2.7 million hectares (HA) out of a total land area of 9.6 million HA is temporary or permanently cultivated and average yield of 1.26 Metric Ton (MT)/HA compared to the regional average of 2.5 MT/HA are harvested, production can be increased by both extensification and intensification (FAOSTAT 2019).

The average area cultivated by household ranges between 0.8 HA (based on the Comprehensive Food Security and Nutrition Survey (CFSNS) 2018, LISGIS 2018b) and 0.85 HA (based on the HIES 2016, LISGIS 2018a). The total domestic production has been slightly volatile but increasing from 296,090 MT to 309,144 MT over the period 2010 – 2016 (FAOSTAT 2019). However, there is a slight decrease of 256,000 MT paddy rice production according to FAO 2023 primary crops production statistics.

Rice has been a staple food in Liberia for decades, shaping the country's history and food policies significantly. The reliance on imported rice has been a longstanding practice, with government policies favoring imports over locally produced rice since the late 1970s. However, recent challenges such as the 4Cs (COVID-19, Climate, Conflict, and Commodity price escalations) have highlighted the unsustainability of this dependence on imports.

In response to these challenges, Liberia has recognized the need to enhance local rice production to ensure food security and reduce vulnerabilities associated with high import prices.

Efforts have been made to boost smallholder production, scale up agribusiness M&SMEs, and attract commercial agri-food enterprises. The government has set ambitious targets to increase domestic rice production significantly over the coming years.

The Fourth Edition of the World Bank's Liberia Economic Update highlighted a positive trend in agricultural sector growth, driven by increased crop production, particularly rice and cassava. Despite this growth, food insecurity remains a significant challenge in Liberia, with a large portion of the population facing moderate or severe food insecurity. The report emphasizes the importance of increasing domestic rice production to meet local demand and alleviate poverty.

The supply-demand dynamics of rice in Liberia underscore the need for substantial investments in the rice sector to improve productivity and address constraints such as limited access to technology, inefficient farming practices, and fragmented value chains. Stakeholder coordination and policy interventions are crucial for enhancing the rice value chain and promoting sustainable production practices.

The evolution of rice in Liberia reflects a shift towards prioritizing local production to enhance food security, alleviate poverty, and address vulnerabilities associated with high import prices. By focusing on improving productivity, investing in technology, and strengthening value chains, Liberia aims to achieve self-sufficiency in rice production and ensure a stable food supply for its population.

Liberia rice is of political and social importance due to the country's reliance on it as its primary staple food crop. Liberia has suitable agroecological conditions for rice production and a large domestic market. However, the sector faces various challenges, including inadequate infrastructure, limited human and technical capacity, weak land rights, as well as agriculture extension and advisory services delivery. Others are the use of rudimentary farming tools, inadequate inputs and processing systems, limited access to finance, low research and development capacity, low private sector investment, uncoordinated government support to the sector, ineffective donor and NGO coordination, and inadequate monitoring and evaluation (M&E) systems.

Investing in the rice value chain in Liberia has the potential to yield multiple benefits that extend beyond just agricultural productivity and profitability. It can play a crucial role in addressing key development challenges such as food security, poverty alleviation, economic growth, vulnerability reduction, environmental sustainability, and resilience building.

- Improved food security: By investing in the rice value chain, Liberia can increase its domestic production of rice, which is a staple food for the majority of the population. This increased production can help reduce reliance on imports and ensure a more stable and secure food supply for the country.
- Poverty alleviation: Enhancing the rice value chain can create opportunities for smallholder farmers to increase their incomes through higher yields and better market access. This can contribute to poverty alleviation by providing sustainable livelihoods for rural communities dependent on rice farming.
- Economic development: Strengthening the rice value chain can boost economic growth by creating employment opportunities along the entire value chain, from farming to processing and distribution. Increased productivity in the rice sector can also stimulate overall economic development in Liberia.

- **Reduced vulnerability:** Investing in improving the efficiency and productivity of the rice value chain can help reduce vulnerabilities associated with food insecurity and price fluctuations. A more robust and self-sufficient rice sector can make Liberia less susceptible to external shocks and market disruptions.
- **Environmental sustainability:** Implementing sustainable practices within the rice value chain, such as promoting efficient water use, soil conservation, and biodiversity protection, can contribute to environmental sustainability and resilience in agriculture.
- **Enhanced resilience:** Building resilience within the rice value chain through investments in technology, infrastructure, and capacity building can help Liberia better withstand climate change impacts, Natural disasters, and other challenges that may affect agricultural production.

18.3. THEORY OF CHANGE OF THE RICE VALUE CHAIN

This table provides a simplified overview of the theory of change for rice value development in Liberia, highlighting the interventions, expected outcomes, and potential impacts of each intervention on the overall goal of enhancing rice production and its value in the country.

Table 32: Theory of change of rice value chain

| Main Issues | Changes to be Achieved | Expected Results | Main Agent of Change | Driving Assumptions | Impact |
|--|--|---|---|---|---|
| Limited access to modern agricultural practices and technologies | increased access to modern agri-practices and tech | Increase in rice production and productivity | Government of Liberia, NGOs, Farmers' Cooperatives | Availability of funding/support from GoL to CARI and DRDRE for training and technology development and transfer | Improved food security, economic growth (linked to NRDS & LASIP II) |
| Lack of infrastructure for post-harvest handling and processing | Improved infrastructure for post-harvest practices and value addition | Reduce post-harvest losses, increased income for farmers | Private sector investors and Government agencies (e.g., CARI, MOA, etc) | Adequate investment in infrastructure development to reduce post-harvest losses | Improved quality of products, increased income for farmers and improved market access |
| Dependence on traditional farming methods | Transition to sustainable agricultural practices facilitated by the use of modern agri-equipment and tools | Increase in food production and productivity, reduction in importation and acceleration of income along the value chain | Agricultural extension services, NGOs, CARI, farmers and | GoL support to agriculture mechanization and farmer willingness/ability to adapt to new farming methods | Environmental sustainability, long-term food security |

18.4. DEVELOPMENT OBJECTIVE OF THE RICE VALUE CHAIN

The development objective for rice value chain development is:

- The global objective for rice value chain development in Liberia is to enhance food security by improving food production, reducing dependency on rice imports, creating jobs, and strengthening the local agricultural sector

Specific objective

- To invest in research and innovation to develop new varieties of rice that are more resilient to pests, diseases, and changing climatic conditions
- To invest in high-quality seed production to ensure improved yields and quality of rice crops.
- To enhance irrigation infrastructure to support consistent and reliable water supply for rice cultivation.
- To develop storage facilities and efficient logistics systems to reduce post-harvest losses and ensure timely delivery of rice to markets.

18.5. EXPECTED OUTPUTS

- 50,000 ha of lowland for irrigated rice production developed over five years
- Appropriate business environment created to attract private-sector involvement in large-scale commercial rice production and processing in five major rice production clusters
- Rice production units (cooperatives established in five major rice production clusters
- Postharvest management facilities (rice mills, warehouses) constructed in five major rice production clusters to facilitate postharvest handling
- National rice self-sufficiency achieved by 70% over five years
- Rice importation reduced by 70% over five years
- Post-harvest losses decreased by 15% within 2 years of NADP implementation
- Rice farmers' income enhance by 30% over the next 5 years

18.6. KEY INTERVENTIONS

18.6.1. Investing in research and innovation to develop new varieties of rice that are more resilient to pests, diseases, and changing climatic condition

Investing in research and development is of utmost importance for the development of new varieties of rice that are high-yielding, resistant to diseases and climate, and nutritionally enriched in Liberia. This would require a collaborative effort between government agencies, research institutions, universities, and international organizations to conduct breeding programs and field trials to bring the best of science to the table. The integration of innovative technologies such as precision agriculture, mechanization, irrigation systems, and digital tools can enhance productivity at every step of the rice value chain. In addition, training programs should be implemented to educate farmers on modern agricultural practices, which can empower them to better handle the challenges of farming and to adopt modern technologies and practices for sustainable growth.

Improving infrastructure such as roads, storage facilities, processing plants, and market linkages is crucial for ensuring that the newly developed rice varieties reach consumers efficiently. This also includes investing in transportation logistics to reduce post-harvest losses and making sure that the rice reaches the consumers in its best possible form. Building the capacity of local farmers, extension workers, researchers, and entrepreneurs is essential for sustaining long-term growth in the rice sector. Training programs should focus on best practices in cultivation, post-harvest management, marketing strategies, and business development to help farmers and entrepreneurs make the most of their resources and improve their livelihoods. By working together and using innovative solutions, we can create a thriving rice sector that benefits everyone.

The implementation of this initiative aimed at developing new rice varieties typically involves a collaborative effort among various entities, including, CARI, MOA, UL, TU and FAO. Ultimately, farmers and agricultural communities are vital stakeholders in the adoption of new rice varieties resulting from research and innovation efforts.

This intervention will mainly take place at the Central Agricultural Research institute (CARI) and other institutions involved in agricultural research in Liberia (such as UL & TU). This investment will contribute to enhancing rice productivity, improving food security, and increasing income opportunities for smallholder farmers in Liberia.

This intervention should be strategically implementing at each stage of the rice value chain – from assessment to adoption – Liberia can enhance its food security, boost rural livelihoods, and reduce its dependence on costly rice imports by carefully investing research and innovations.

Investing in research and innovation to develop new varieties of rice can have a significant impact on agriculture, food security, and economic development in countries like Liberia over the next five year. By improving the quality, yield, and resilience of rice crops, this initiative will benefit farmers, consumers, and the overall economy.

18.6.2. Investing in high-quality seed production to ensure improved yields and quality of rice crops

Investing in the production of high-quality seeds is of utmost importance for the improvement of both yield and quality of rice crops in Liberia. It is a well-known fact that high-quality seeds are indispensable to ensure better germination rates, disease resistance, and overall crop productivity. By using improved seeds, farmers can significantly enhance their harvests and contribute to the food security in the country. However, to fully reap the benefits of high-quality seed production, it is crucial to integrate this component into the broader rice value chain in Liberia. This integration must cover the entire process of ensuring that improved seeds reach farmers efficiently and that they receive adequate support throughout the cultivation process. Failure to integrate this component may lead to losses and decreased productivity for farmers, which could hurt food security in the country.

- The implementation of these interventions to enhance seed production for rice crops in Liberia would require a collaborative effort involving government agencies like the Ministry of Agriculture, research institutions such as CARI, NGOs working in agriculture and rural development, as well as agricultural development partners. By leveraging the expertise and resources of these stakeholders, it is possible to achieve improved yields and quality of rice crops through investments in high-quality seed production.
- The planned intervention is most likely to take place in the rice producing regions of the country, namely Bong, Lofa, Nimba, Gbarpolu, Margibi and Grand Bassa Counties) specifically in areas where rice farming is prevalent. According to the Food and Agriculture Organization (FAO 2021) of the United Nations, rice is the staple food for over 70% of Liberians, making it a crucial agricultural commodity for the country's food security and economy.
- This intervention should be strategically implemented at each stage of the rice value chain from production to post-harvest handling – Liberia can enhance its food security, boost rural livelihoods, and reduce its dependence on costly rice imports by carefully investing in the production of high-quality seeds.
- Investing in high-quality rice seed production is crucial for ensuring improved yields and quality of rice crops in Liberia. By focusing on producing superior rice seeds, farmers can enhance their agricultural productivity, increase their income, and contribute to food security in the country. This intervention targets a wide range of beneficiaries, including smallholder farmers, agricultural cooperatives, seed producers, and the overall economy of Liberia.

18.6.3. Enhancing irrigation infrastructure to support consistent and reliable water supply for rice cultivation

Liberia is a country that faces significant challenges in its agricultural sector, particularly in rice cultivation. A key factor that could significantly improve rice production in Liberia is the enhancement of irrigation infrastructure as an integral part of the rice value chain. With reliable access to water through enhanced irrigation infrastructure, farmers can cultivate rice more efficiently throughout the year, leading to increased yields and improved food security. This, in turn, can help to enhance the livelihoods of farmers and their families.

To achieve this component, the government and relevant stakeholders must prioritize investments in building and upgrading irrigation systems that meet the specific needs of rice farmers; provide training and technical assistance to farmers on efficient water use, maintenance of irrigation facilities, and modern farming practices to ensure successful implementation.

It is crucial to establish supportive policies that encourage the use of irrigation technologies and promote sustainable water management practices to achieve long-term success in rice production. This will ensure that the advantages of irrigation infrastructure are maintained over time and that farmers can consistently produce high-quality rice crops.

Collaborations between the public sector, private companies, NGOs, and international organizations could facilitate the funding and implementation of large-scale irrigation projects. These stakeholders can ensure that Liberia's agricultural sector becomes more productive, sustainable, and profitable to help create job opportunities, drive economic growth, and improve the quality of life for Liberians.

The planned intervention will be implemented by the government of Liberia in collaboration with international organizations and donor partners. The Margibi Rice Scheme, is a major irrigation project initiated in 1973 with the support of the Food and Agriculture Organization (FAO) of the United Nations. The scheme covers approximately 2,500 hectares of land and provides irrigation facilities to over 5,000 farmers. The Cecil Dennis Rice Scheme, established in 2014, is a newer irrigation project covering around 1,500 hectares of land in Grand Bassa County. The scheme aims to provide modern irrigation systems and support services to smallholder farmers. The gbedin irrigation covers an estimated area of 400 ha, the CARI irrigation scheme is approximately 20 ha and the kpatawee irrigation is approximately ___ ha. Enhancing this existing irrigation infrastructure through interventions such as rehabilitation of the systems, construction of new facilities, and implementation of water management practices will help ensure consistent and reliable water supply for rice cultivation in Liberia.

Enhancing irrigation infrastructure is essential for supporting consistent and reliable water supply for rice cultivation in Liberia. By strategically implementing interventions at the different growing stages of the rice, farmers can improve productivity, increase food security, and contribute to economic development.

Enhancing irrigation infrastructure to ensure a consistent and reliable water supply for rice cultivation in Liberia has the potential to benefit a substantial number of farmers and communities dependent on this vital crop. By providing access to improved irrigation systems, not only can agricultural productivity increase but also food security and livelihoods can be enhanced across various regions in Liberia.

18.6.4. Developing storage facilities and efficient logistics systems to reduce post-harvest losses and ensure timely delivery of rice to markets

The rice value chain in Liberia is a complex system that involves developing storage facilities and efficient logistics systems; these are crucial to reducing post-harvest losses and ensuring the timely delivery of rice to markets. By focusing on improving storage infrastructure and streamlining transportation processes, stakeholders could enhance the overall efficiency of the rice value chain in Liberia.

Storage facilities play a vital role in preserving the quality of rice after harvest. Inadequate storage infrastructure can lead to significant post-harvest losses due to spoilage, pests, and environmental factors. Therefore, stakeholders should invest in modern storage facilities such as warehouses equipped with proper ventilation, temperature control, and pest management systems. This way, losses can be minimized, and the quality of rice products can be maintained. Adequate storage infrastructure can also ensure the availability of rice products throughout the year, thereby enhancing food security in Liberia.

Efficient logistics systems are essential for ensuring the timely delivery of rice to markets. A well-designed logistics network helps streamline transportation processes, reduce transit times, and lower transportation costs. By optimizing routes, utilizing appropriate transportation modes, and implementing effective inventory management practices, stakeholders can improve supply chain efficiency and meet market demand more effectively. This, in turn, can lead to increased revenue for farmers and other stakeholders in the rice value chain, thereby contributing to the economic growth of Liberia.

Implementing any initiatives aimed at developing storage facilities and efficient logistics systems to reduce post-harvest losses would typically involve multiple stakeholders working together, and the primary implementing bodies for such endeavors will include the Ministry of Agriculture, NGOs, private sector entities, and the Research Institute (CARI) working together towards a common goal of enhancing food security and agricultural sustainability.

Identifying key agricultural zones where rice production is significant would be crucial in determining the locations for establishing storage facilities and improving logistics. These zones could include areas like Lofa County, Bong County, Nimba County, and Grand Gedeh County, among others.

Farmers will effectively minimize or prevent post-harvest losses, improve the handling of harvested rice, and enhance food security by strategically implementing the intervention and best practices before the reproductive stage of the rice in the fields. This intervention will include but not limited to:

- Using modern storage facilities.
- Effective pest control measures.
- Adopting proper harvesting techniques.
- Implementing quality control mechanisms.

By implementing this intervention, farmers will minimize the risks of damage, spoilage, or contamination of their crops, which can result in significant financial losses and food waste. Furthermore, enhancing the post-harvest handling of our rice and storage practices will ensure that the rice is better preserved and the quality is maintained.

18.7. Action Plan

Table 33: Action plan for the rice value chain

| No | Priority Interventions | Specific Actions | Strategic Goal |
|----|--|--|--|
| 1 | Support Farmers to Increase Production and processing of the Country's Main Staple Food Crop (rice), and promote | 1. Ensure full implementation of the National Rice Development Strategy of 2018 to enable Liberia achieve national rice self-sufficiency | Reduce rice-import dependence and promote national rice self-sufficiency and increase farmers income |

| | | | |
|--|---|--|--|
| | commercialization of the rice value chain | <p>2. Incentivize private-sector participation in certified rice seed production for supply to farmers</p> <p>-</p> <p>3. 50,000 ha of lowland for irrigated rice production developed over five years</p> <p>-</p> <p>4. Appropriate business environment created to attract private-sector involvement in large-scale commercial rice production and processing in five major rice production clusters.</p> <p>-</p> <p>5. Rice production units (cooperatives) established in five major rice production clusters/regions and supported to annually develop 3,000 ha of lowland for rice production</p> <p>-</p> <p>6. Postharvest management facilities (rice mills, warehouses) constructed in five major rice production clusters to facilitate postharvest handling</p> <p>-</p> <p>7. Encourage and support research in development of rice varieties adaptable to local ecology, and improve palatability of existing varieties</p> <p>-</p> <p>8. National rice self-sufficiency achieved by 70% over five years</p> <p>-</p> <p>9. Rice importation reduced by 70% over five years</p> <p>-</p> <p>10. Post-harvest losses decreased by 15% within 2 years of NADP implementation</p> <p>-</p> <p>11. Rice farmers' income enhance by 30% over the next 5 years</p> | |
|--|---|--|--|

18.8. Budget

Table 34: Budget of the rice value chain program (five years)

| Purchases | units | Quantity Year 1 | Qty Year 2 | Qty Year 3 | Qty Year 4 | Qty Year 5 | Unit cost | Cost Y1 | Cost Y2 | Cost Y3 | Cost | | Total Cost |
|--|------------|-----------------|------------|------------|------------|------------|--------------|---------------|---------------|--------------|---------------|--------------|-----------------------|
| | | | | | | | | | | | Y4 | Y5 | |
| Lowland developmwn | 50, 000 ha | 20,000 | 10,000 | 10,000 | 5,000 | 5, 000 | 3,500.00 | 70,000,000.00 | 35,000,000.00 | 35000000 | 17,500,000.00 | 7,500,000.00 | 165,000,000.00 |
| Laboratory facilities built & equipped | 3 | 2 | 1 | | | | 750,000.00 | 1,500,000.00 | 750,000.00 | | | | 2,250,000.00 |
| Training (advanced) | | | | | | | | | | | | | |
| MSc | 15 | | 8 | 7 | | | 35,000.00 | | 280,000.00 | 245000 | | | 525,000.00 |
| Ph.D | 6 | | 4 | 2 | | | 45,000.00 | | 180,000.00 | 90000 | | | 270,000.00 |
| Storage facility | 5 | 1 | 1 | 1 | 1 | 1 | 150,000.00 | 150,000.00 | 150,000.00 | 150,000.00 | 150,000.00 | 150,000.00 | 750,000.00 |
| Logistics (vehicles) | 15 | 10 | 5 | | | | 60,000.00 | 600,000.00 | 300,000.00 | | | | 900,000.00 |
| Equipment (tractor) | 30 | 30 | | | | | 25,000.00 | | | | | | |
| Equipment (power tiller) | 50 | 30 | 20 | | | | 5,000.00 | 150,000.00 | 100,000.00 | | | | 250,000.00 |
| Equipment (Rice mill) | 5 | 1 | 3 | 1 | | | 1,532,000.00 | 1,532,000.00 | 4,596,000.00 | 1,532,000.00 | | | 7,660,000.00 |
| Training of farmers | | | | | | | | | | | | | 650,000.00 |
| Grand total | | | | | | | | | | | | | 178,255,000.00 |

18.9. Implementation Arrangements

Table 35: Implementation Arrangements Plan for rice value chain in Liberia

| Implementation Area | Description | Implementation agent(s) |
|---|--|--|
| Boosting Smallholder Production | Enhancing support for small-scale rice farmers to increase their yields and productivity. This includes providing access to improved seeds, tools, and training on modern farming techniques. | Smallholder farmers, agricultural cooperatives, Ministry of Agriculture and CARI |
| Scaling Agribusiness MSMEs | Supporting micro, small, and medium-sized enterprises in the rice sector to expand their operations. This involves providing financial assistance, technical support, and market linkages to help these businesses grow. | MOA, Local and international banks and LIBA |
| Attracting Commercial Agri-food Enterprises | Encouraging larger agri-food companies to invest in Liberia's rice value chain. This may involve offering incentives, creating a conducive business environment, and facilitating partnerships between local and international firms. | MOA, private sector investors. Farmers and donor partners |
| Improving Technology Adoption | Promoting Research and the use of innovative technologies in rice production, processing, and distribution. This includes introducing new varieties, mechanized farming equipment, digital platforms for marketing, and efficient post-harvest handling systems. | MOA, CARI, NGOs, private sector and farmers |
| Strengthening Market Access | Enhancing infrastructure for transporting rice from farms to markets, improving storage facilities to reduce post-harvest losses, and establishing reliable supply chains to ensure consistent availability of locally produced rice. | MOA, CARI, NGOs, international development partners and farmers |

18.10. Financial Plan

This table outlines the different funding sources along with the allocated amounts and their respective purposes in the financing plan for rice value chain development in Liberia. The table below outlines a potential financing plan involving relevant financial partners:

Table 36: Potential financing plan for the rice value chain

| Source of Funding | Amount (USD) | Purpose |
|---------------------------|-----------------------|----------------------------------|
| Government Grants | 80,080,044.00 | Research and Development |
| International Aid (grant) | 45,769,000.00 | Infrastructure Improvement |
| Private Investment | 30,405,756.00 | Technology Adoption |
| Bank Loans | 22,000,200.00 | Expansion of Production Capacity |
| Grand total | 178,255,000.00 | |

18.11. Rapid-Cost Benefit

A rapid cost-benefit analysis of the rice value chain in Liberia involves evaluating the costs and benefits associated with the production, processing, and distribution of rice in the country. This analysis helps stakeholders understand the economic viability and potential returns on investment in the rice sector.

Table 37: Cost and benefit analysis of rice value chain in Liberia

| Category (Targets) | Costs (USD) | Output | Benefits(USD) |
|--|-----------------------|-----------------------|-----------------------|
| Develop 113, 503 ha of lowland for rice production over five years | 170,254,500.00 | 425,636,250.00 | 255,381,750.00 |
| develop 3,000 ha of lowland for rice production each year | 4,500,000.00 | 11,250,000.00 | 6,750,000.00 |
| Total | 174,754,500.00 | 436,886,250.00 | 262,131,750.00 |

18.12. Result Framework

Table 38: Result framework of rice value chain in Liberia (use the global objective to develop the result framework and baseline, midline and end lines results)

| Development Objectives | Indicators (Baseline, Midline, Endline) | Means of Verification | Hypothesis |
|--|---|---|--|
| I. To enhance food security by improving rice production | Baseline: 100,000 metric tons; Midline: 120,000 metric tons; Endline: 150,000 metric tons | Field surveys and reports from Ministry of Agriculture | Improved rice production will lead to increased food security |
| II. To reduce the country dependency on rice importation | Baseline: 44.6%; Midline: 35%; Endline: 20% | Import data, production data and market analysis data | Promotion of mechanized farming, investment in CARI R4D initiatives and support to farmers will increase local production and reduce importation |
| III. To create more jobs in the rice sector | Baseline: 500, 000 jobs Midline: 800, 000 Endline: 940, 650 | MOA reports, world bank reports, ILO report and report from FAO | Efforts by key stakeholders to improve productivity and address constraints within the rice sector will likely lead to increased job opportunities |
| SPECIFIC OBJECTIVES | | | COST (USD) |
| 1. To invest in research and innovation to develop new varieties of rice that are more resilient to pest, diseases and changing climatic conditions | | | 4,860,000.00 |

Activity 1: Conducting genetic studies to identify desirable traits for new rice varieties

Activity 2: Testing new rice varieties in different environments to assess performance and adaptability

Activity 3: Utilizing biotechnological and molecular tools to enhance rice traits such as disease resistance or yield

Activity 4: Provide training to researchers/technicians and farmers on modern agricultural practices

Activity 5: Establish or upgrade research facilities and laboratories for advanced research

Activity 6: Improve the human resource capacity to conduct evident-based research rice development and improvement

2. To invest in high-quality seed and paddy production to ensure improved yields, quality of rice crops and increased productivity.

Activity 1: Conduct research to identify the best seed varieties suitable for the Liberian climate and soil conditions

Activity 2: Test the quality of seeds through germination tests, purity analysis, and other quality control measures

Activity 3: Prepare the fields for seed production by plowing, leveling, and ensuring proper irrigation systems are in place

Activity 4: Plant seeds at the right time and depth to optimize growth and yield potential

Activity 5: Implement proper crop management practices such as fertilization, weed control, and pest management throughout the growing season

Activity 6: Harvesting the rice crop at the right time to ensure maximum yield and quality

Activity 7: Properly thresh, dry and store the harvested rice to maintain its quality

Activity 8: Process harvested paddy into polished rice for marketing locally or internationally

170,659,500.00

| | |
|---|----------------------------|
| <p>Activity 9: Continuously monitor the progress of the seed production process and evaluating outcomes to make necessary adjustments for improvement</p> <p>Activity 9: Develop at least 113, 503 ha of lowland rice in five years</p> | |
| <p>3. To enhance irrigation infrastructure to support consistent and reliable water supply for rice Cultivation</p> <p>Activity 1: Conduct a comprehensive assessment of the current irrigation infrastructure</p> <p>Activity 2: Developing a detailed plan for enhancing the infrastructure to meet the water demands of rice cultivation</p> <p>Activity 3: Repair or install irrigation system where needed</p> <p>Activity 4: Provide training to farmers on efficient water use and best irrigation practices</p> <p>Activity 5: Establish monitoring mechanisms to track water usage and system performance</p> <p>Activity 6: Evaluate the impact of the enhanced irrigation infrastructure on rice production</p> | <p>1,268,500.00</p> |
| <p>4. To develop storage facilities and efficient logistics systems to reduce post-harvest losses and ensure timely delivery of rice to markets</p> <p>Activity 1: Conduct feasibility study on the possibility of reducing post-harvest losses using improved storage and efficient logistics</p> | <p>1,467,000.00</p> |

- Activity 2: Construct storage warehouses for rice products in three rice-producing regions of Liberia
- Activity 3: Install cooling and ventilation systems at storage facilities
- Activity 4: Purchase/provide vehicles for market operations
- Activity 5: Train farmers on logistics operation

In Liberia, rice is a staple food and a critical component of the country’s economy. Specific targets for rice development need to be established to enhance rice production and ensure food security, as seen in Table 10.

Table 39: Rice Value Chain Development Target for Liberia

| Priority Intervention | Specific Actions | Strategic Goals |
|---|---|---|
| Increase rice production through improved agricultural practices | Provide training on modern farming techniques, access to quality seeds, and irrigation systems | Achieve self-sufficiency in rice production and reduce import dependency |
| Enhance post-harvest processing and storage facilities | Establish modern processing units, improve storage infrastructure, and promote value addition | Minimize post-harvest losses, ensure food security, and boost income generation |
| Strengthen agricultural extension services | Expand extension programs, provide technical assistance to farmers, and disseminate knowledge on best practices | Enhance farmers’ skills and knowledge, increase productivity, and promote sustainable agriculture |
| Improve access to credit and financial services for smallholder farmers | Facilitate access to microfinance institutions, develop credit schemes tailored to farmers’ needs, and promote financial literacy | Empower farmers economically, enhance investment in agriculture, and foster rural development |

XIX. CASSAVA VALUE CHAIN

19.1. CONTEXT

Cassava is among a few of the root and tubers grown in most tropical regions in Latin America, Asia and Africa. The need for cassava has increased due to its multiple values as a food security and nutrition crop, an animal feed, and its value beyond food security unto industrial use such as biofuel, beverages, starch, etc.

19.2. JUSTIFICATION OF THE CASSAVA VALUE CHAIN

The cassava (*Manihot Esculenta Crantz*) subsector is a significant source of income earnings for many Liberian agricultural households, particularly for women and youth. It is the second staple food crop of the country, with several derivatives, including gari, fufu, deeper, high-quality cassava Flour (HQCF), Starch, livestock feed, etc. Annual per capita consumption of Cassava is estimated at 121 kg.

Cassava is produced by over 60% of farming households; it is a significant contributor to the agriculture sector of Liberia. In 2022, 637,819.24 metric tons of cassava was produced on 77,013 hectares with an average yield of 8.28 t/ha.

The subsector is beset by several challenges impeding its growth and development. The key challenges are: i.) Limited market access, ii) Limited access to finance, iii.) Limited access to labor-saving technologies (Mechanization), and v.) Limited access to improved productive input and planting material. Others include low private sector investment, limited infrastructure, high cost of production, and limited extension services.

The factors limiting producers' access to the market are critical to farmers engaging in commercial-scale production. The key factors limiting market access include poor farm-to-market roads, poor transportation systems, weak market linkages, information systems, low-quality products, lack of standardization to compete on domestic and external markets, high cost of production, and limited agricultural extension and advisory services.

In 2020, a study was conducted in Nimba County showing the mean revenue efficiency among cassava farmers to be at 12.9%, suggesting a huge economic return of about 87.1% which has the potential to increase economic efficiency among cassava farmers. Based on this assumption, better access to agricultural extension and advisory services can improve production and productivity thereby enhancing farmers' livelihood. Cassava is produced by over 80% of farming households and it is an important contributor to Liberia's GDP (550 000 metric ton in 2007, for an estimated value of US \$ 39,633,000).

Cassava is a rich source of carbohydrates and provides essential nutrients such as vitamin C, folate, and minerals. Improving the cassava value chain can enhance access to nutritious food, particularly for vulnerable populations such as children, pregnant women and lactating mothers. Thereby improving their overall nutrition and food security.

Cassava serves as one of the staple food crops for a large portion of Liberia's population, providing a significant portion of the caloric intake for many households. By improving the cassava value chain including production, processing and marketing, Liberia can ensure a more stable and diverse food source for its population, reducing reliance on single stable crops and enhancing overall food security.

Improving the cassava value chain also creates opportunities for smallholder farmers to increase their income through higher yields and better market access. Increased income from cassava

cultivation will enable farmers to purchase other food items and essential goods, improving their overall food security and economic well-being.

In December, the price for a 25 kg bag full of cassava increased by a marginal 5% on average from LRD 1,240 to LRD 1,300 respectively between November and December 2023. High production areas like Greenville, Sinoe County and Barclayville, Grand Kru County recorded the cheapest prices for the commodity at LRD 560 and LRD 610 respectively in December 2023.

In the Red Light, Duala and Buchanan markets are notably the most expensive areas to purchase cassava which can be explained by the huge demand by restaurants and consumption by the population in these urban centers. Observations show that the price for a 25kg bag full of cassava is LRD 2950 in Red Light, LRD 2,560 in Duala and LRD 1,800 in Buchanan. Moreover, most households, especially vulnerable households in rural areas use cassava as a cheap substitute for rice to bridge the shortfall in their food gap.

Cassava is known to grow in poor soils and marginal environments. By promoting sustainable agricultural practices such as intercropping, crop rotation, mulching and agroforestry, the cassava value chain can improve soil health, fertility and structure, thus conserving natural resources and reducing environmental degradation. Cassava is relatively drought tolerant and resilient to climate variability, making it an important crop for adaptation to climate change in Liberia. By promoting climate-smart agricultural practices and resilient cassava varieties the value chain can enhance farmers' resilience to climate-related risks such as drought, floods and extreme temperatures.

19.3. Theory of Change of the Development of Cassava Value Chain

| What are Main issues to be solved to boost the value chain development? | What will be the transformation/change to develop? | What will be the results coming out of these transformation/change? | Who will be the main agents of change or transformation? | What are the assumptions that will drive change (political will of the Government, commitment of technical and financial partners, participation of young people and women, etc.)? | What will be the impacts and links with the Global Government economic policies |
|---|---|--|--|---|--|
| Limited access to improved productive inputs, planting materials and Extension services | *Provide access to improved inputs, planting materials and contemporary extension and advisory services. | *Farm output will increase *Resource efficiency will be optimized | * Farmers *Extension Technicians *Agropreneurs (input dealers) | * Training and capacity building of actors to provide and use the inputs in the right manner * Allocation and funding availability to procure or engaged an PPP model for sustainability | *Agriculture Productivity will increase * Increase economic job and opportunities to benefit from input market |
| Limited access to labor-saving technologies (mechanization) | * Increase access to mechanization services | Transformational land preparation /planting area; *modernizes agriculture | *Machinery vendors, * Rental Services providers; *Fabricators | *Client willing-to-pay for services and demand is high; *Private investment in spare parts and after sale services *Capacity for local repairs/fabricators to enhance development of equipment *Availability of partners to support initiative of such | *Modernize Agriculture and make it attractive to the most challenged such as youth, women and less-fortunate; *Reduces drudgery and relocate labor to other sectors |
| Limited Access to Finance and private sector investment | *Support arrangements (loans, grants, subsidies credits, etc.) with financial institutions to provide agriculture | Access to finance will improve actors' performance along the cassava value chains for more | *Financial institutions (banks, microfinance, | - willingness of financial institution to venture into the cassava value chain; | * Private investment will soar in the agriculture sector; jobs/economic opportunities will be created; food security |

| What are Main issues to be solved to boost the value chain development? | What will be the transformation/change to develop? | What will be the results coming out of these transformation/change? | Who will be the main agents of change or transformation? | What are the assumptions that will drive change (political will of the Government, commitment of technical and financial partners, participation of young people and women, etc.)? | What will be the impacts and links with the Global Government economic policies |
|---|---|---|---|--|---|
| | supported loans and access to finance opportunities | economic benefits, livelihood and rural development | VLSA, local saving clubs, etc.) *Farmer & MSMEs | - capacity for beneficiaries to manage fund that they access; - Government and/or regulatory support to the provision of the arrangement to make it fair | and livelihood will improve |
| Limited Access to market and supporting value chain infrastructures | Encourage private investment into market information generation and infrastructure development (warehouse, storage, solar stations, etc.) | *Increase industrial processing *Strengthen the linkage b/w producers & buyers * Standard fair price of cassava at all levels of value chains | *Government (MOA, MOCI, MPW, EPA, LACRA) * Private investors *MSMEs especially Agpreneurs | *Encourage and/or establish communal farming system; * a supporting policies environment for investment in farm-market infrastructure and contractual arrangement | *Increase supply of farm products and derivatives; *Meeting the domestic food and industrial needs of cassava; *Increase export to high-value markets |

19.4. THE DEVELOPMENT OBJECTIVE OF THE CASSAVA VALUE CHAIN

The development objective of the cassava value chain is:

- To enhance farmers' productivity, and market access and promote economic growth.

Specific objectives

- Improve infrastructure along the cassava value chain
- Improve access to finance along the cassava value chain
- Develop and strengthen access to inputs and extension and advisory service to ensure adequate sustainable production and processing along the value chain
- Empower small holder farmer organizations and foster an entrepreneurship mindset
- Strengthening research and development

19.5. EXPECTED OUTPUTS

- 20,000 hectares of secondary forestland under mechanized cassava cultivation developed over five years
- 10,000 cassava production units (cooperatives) with 20 members each cultivating 2 ha (5 acres) established in six designated counties
- Appropriate business environment created to attract private-sector investment in large-scale commercial cassava production and value addition in six major production counties
- Creation of aggregation units facilitated to link of fresh cassava root producers to processors
- Cassava-cutting multiplication sites (10 hectares each) established in six major cassava-producing counties of Liberia
- Yield of Cassava increased by minimum 20mt/ha

19.6. KEY STRATEGIC INTERVENTIONS

19.6.1. Improve infrastructure along the cassava value chain

Under this component, the project will encourage private-sector investment in the establishment of large-scale cassava processing plants for transformation of fresh cassava roots into starch and other products, support mechanized large-scale cassava production to promote sedentary cassava production practices and strengthen cassava product market and marketing infrastructures

- **Activity 1: Encourage private-sector investment in the establishment of a large-scale cassava processing plant for the transformation of fresh cassava roots into starch and other products.**

Post-harvest activities such as storage, transportation, processing, packaging and distribution of cassava will be supported for the reduction of losses. Incentives to the private sector to invest in postharvest activities will be made with a view to supporting sustained raw material supply to markets, and small and medium scale agro-enterprises. This will encourage private-sector

investment in the establishment of large-scale cassava processing plant for the transformation of fresh cassava roots into starch and other products.

- **Activity 2: Support mechanized large-scale cassava production to promote sedentary cassava production practices**

The government will ensure the effective implementation of a yield improvement programme through mechanized cassava production. The government will establish modalities and regulation framework for the production of improved cassava planting materials and other agro-inputs; increased investment in research and development; provision of appropriate infrastructure for cassava production; intensification of agricultural mechanization, reinvigoration of agricultural extension services

- **Activity 3: Strengthen cassava product market and marketing infrastructures**

Smallholder cassava farmers require easy access to markets to sell their produce. The Ministry of Agriculture will provide accessible markets to enable easy trading of cassava commodities in the 15 counties of Liberia. The Ministry of Agriculture and its partners will direct resources to provide modern infrastructure that will ease the trading of cassava commodities by constructing market facilities.

19.6.2. Improve access to finance along the cassava value chain

Under this activity, the project will provide smallholder farmers access to finance by building their capacity to operate competitively in the cassava value chain. The project will provide smallholder farmers with management and financial training tools and establish a more reliable linkage with sellers and buyers.

- **Activity 1: Provide smallholder farmers access to finance by providing grants to improve their capacity to operate competitively in the cassava value chain**

Under this activity, the project will improve access to finance for cassava farmer groups and SMEs by building their capacity to interact with financial service providers. Access to finance is one of the most critical constraints facing cassava farmers in Liberia. Currently, the supply of financial services is very limited, especially for cassava farmers and SMEs. The government of Liberia will create an enabling environment for cassava farmers and SMEs to access a broad range of financial services including credit, savings, insurance and lending from commercial banks to facilitate their activities.

- **Activity 2: Provide smallholder farmers management and financial training tools and establish a more reliable linkage with sellers and buyers**

Under this activity, the project will provide managerial and financial training for smallholder farmers and build a more robust and guaranteed markets through productive alliances and market linkages

19.6.3. Develop and strengthen access to inputs and extension and advisory services to ensure adequate sustainable production and processing along the value chain

Under this component, the project will develop and strengthen farmer's access to improved planting materials, tools, and agriculture extension and advisory services delivery. Promote the development of 20,000 ha of land for cassava production over five years, support the formation and empowerment of cassava production cooperatives in designated counties for large-scale cassava production, Facilitate the introduction of high-yielding cassava varieties and improved production technologies for use by local farmers, The project will support both the research and technological needs of the Central Agricultural Research Institute and the Ministry of Agriculture to implement this component. The project will support increased adoption and upscaling of agronomic technologies by boosting varietal development, improving crop management techniques and improving production, certification, on-farm propagation and distribution of clean cassava planting materials.

- **Activity 1: Develop and strengthen farmer's access to improved planting materials, tools, and agriculture extension and advisory services delivery**

Cassava value chain players require the use of improved technology to enhance productivity. Quality agricultural inputs such as improved cuttings, fertilizers and agrochemicals are major determinants of high productivity and production in the cassava sector. The high cost, coupled with unavailability of improved agro-inputs including improved cuttings and fertilizers constrain farmers to low adoption and utilization of these inputs. Inadequate and uncoordinated agricultural research and a limited number of Agricultural Extension Agents play a major role in reducing this production and productivity. Under this sub-component, farmers' access to improved inputs will be enhanced through: the adoption of regulation for the cassava sector; provision of incentives to farmers and waiver of tariffs. The Ministry of Agriculture will improve extension service delivery through the use of e-extension and recruiting more Agriculture Extension and Advisory Service technicians to improve technical service provision and technology dissemination to farmers; and building capacities of actors along the cassava value chain.

- **Activity 2: Promote development of 20,000 ha of land for cassava production over five years**

Under this sub-component, the project will support farmers with productive inputs to develop and cultivate 20000 hectares of cassava.

- **Activity 3: Support the formation and empowerment of cassava production cooperatives in designated counties for large-scale cassava production**

Under this component, the Ministry of Agriculture is committed to promoting the aggregation of smallholder farmers into cooperatives in the cassava clusters. Grouping the cassava value chain actors into clusters is important for improving the competitiveness of the cassava sector. The Ministry of Agriculture will conduct periodic coordination meetings aimed at harmonising approaches and avoiding overlaps.

19.6.4. Empower small holder farmer organizations and foster an entrepreneurship mindset

Under this component, Promote the establishment of strong linkage between cassava-producing cooperatives and processors, support the National Cassava Sector Coordinating Committee to legislate and implement the Liberia 10% Cassava -Wheat-Composite Flour Law the project will conduct a capacity need assessment to build the capacity of actors along the entire cassava value chain for improved performance and sustainability. The project will conduct training needs assessments based on market requirements, organize training for farmers and other stakeholders along the value chain, and provide training in Good Agriculture Practices (GAP) and Climate Smart Agriculture (CSA) practices to extension workers, farmers and processors

- **Activity 1: Support the National Cassava Sector Coordinating Committee to legislate and implement the Liberia 10% Cassava -Wheat-Composite Flour Law**

Under this component, the Government will also take the lead in updating the legislative branch of Government about the importance of legislating the 10% cassava-wheat-composite flow law. This initiative will boost the sales of cassava and increase the income of actors in the sector

- **Activity 2: Promote the establishment of a strong linkage between cassava-producing cooperatives and processors**

The project will conduct training needs assessments based on market requirements, organize training for farmers and other stakeholders along the value chain, and provide training in Good Agriculture Practices (GAP) and Climate Smart Agriculture (CSA) practices to extension workers, farmers and processors.

19.6.5. Strengthening research and development

Under this specific objective, the project will facilitate and strengthen cassava research to develop and adopt improved varieties suitable for the production of various cassava-based products. The project will strengthen the capacity of public and private institutions to engage in the development of appropriate technologies for production and postharvest handling as well as strengthen the national extension service-delivery system to disseminate and train farmers in the adoption of such technologies. This will be done with a focus on adequate quantity, quality and timely delivery of agricultural produce. The capacity of value chain actors in negotiation and contracting will be built to enhance trade. The actions of actors will be guided by setting grades, standards and regulations within the market space.

- **Activity 1: Facilitate and strengthen cassava research**

Under this component, the project will the project will facilitate and strengthen cassava research to develop and adopt improved varieties suitable for the production of various cassava-based products. The project will strengthen the capacity of public and private institutions to engage in the development of appropriate technologies for production and postharvest handling as well as strengthen the national extension service-delivery system to disseminate and train farmers in the adoption of such technologies.

19.7. Action Plan

Table 40: Implementation plan of the cassava value chain development plan

| Action/Activity | Start Date | End date | Person / institution Resp. |
|--|------------|----------|----------------------------|
| Specific Objective One: Improve infrastructure along the cassava value chain | | | |
| OUTCOMES | | | |
| <i>Outcome One:</i> Four large scale cassava processing plant for transforming fresh cassava roots to other products established | | | |
| <i>Outcome Two:</i> Fifteen large scale mechanized cassava production sites established | | | |
| <i>Outcome Three:</i> Five cassava product market strengthened | | | |
| ACTIVITIES | | | |
| Key Activity 1: Encourage private-sector investment in the establishment of five large-scale cassava processing plant for transformation of fresh cassava roots into starch and other products. | | | |
| Sub-Activity 1.1: Land acquisition and preparation at five sites for the construction of large-scale cassava processing plant | | | |
| Sub-Activity 1.2: Construction of 5 new cassava processing factory | | | |
| Sub-Activity 1.3: Procure and install processing equipment (according to spec.) in the 5 new processing plant | | | |
| Sub-Activity 1.4: Provide financing support (grant, loan or both) to purchase raw materials and cover 12 months operation cost for the five-processing plant | | | |
| Sub-Activity 1.5: Create appropriate business environment to attract private –sector investment in large commercial cassava production and value addition in six major production counties | | | |
| Sub-Activity 1.5: Creation of cassava aggregation units to facilitate and like fresh cassava root producers to processors | | | |
| Key Activity 2: Support 15 mechanized large-scale cassava production to promote sedentary cassava production practices | | | |
| Sub-Activity 2.1 Land acquisition and preparation at five sites for the construction of mechanized large scale cassava processing plant | | | |
| Sub-Activity 2.2: Strengthen the capacity of the management team based on identified gaps | | | |

| | | | |
|---|--|--|--|
| Key Activity 3: Strengthen five cassava product market and marketing infrastructures | | | |
| Sub-Activity 3.1: Modernized five cassava product market | | | |
| Sub-Activity 3.2: Procure and install processing equipment (according to spec.) in the 5 modernized market | | | |
| Sub-Activity 3.3: Financing support (grant, loan, or both) to purchase raw cassava and cover 12 months operation cost for the five sites | | | |
| Sub-Activity 3.4: Promote technology adoption and upscale by stakeholders through training and knowledge exchange scheme (local & external) | | | |
| Specific Objective Two: Improve access to finance along the cassava value chain | | | |
| OUTCOMES | | | |
| <i>Outcome One: Access to finance enhanced</i> | | | |
| ACTIVITIES | | | |
| Key Activity 1: Provide smallholder farmers access to finance by providing grant to improve their capacity to operate competitively in the cassava value chain | | | |
| Sub-Activity 1.1: Building the capacity 50 farmers groups and 25 SMEs to interact with financial service providers | | | |
| Key Activity 2: Provide smallholder farmers management and financial training tools and establish a more reliable linkage with sellers and buyers. | | | |
| Sub-Activity 2.1: Provide managerial and financial training for 50 farmers groups and 25 SMEs to access (grant, loan or both) for the purchase of inputs covering 12 months operation cost | | | |
| Specific Objective Three: Develop and strengthen access to inputs and extension and advisory service to ensure adequate sustainable production and processing along the value chain | | | |
| OUTCOMES | | | |
| <i>Outcome One: Access to productive inputs packages enhanced (Agrochemicals, Cuttings, improved, equipment, tools, and training)</i> | | | |
| ACTIVITIES | | | |
| Key Activity 1: Develop and strengthen farmer's access to improved planting materials, tools, and agriculture extension and advisory services delivery | | | |
| Sub-Activity 1.1: Establish 10,000 cassava production units (cooperatives) with 20 members each cultivating 2 hectares in six designated counties | | | |
| Sub-Activity 1.2: Provide productive input packages to smallholder farmers | | | |

| | | | |
|---|--|--|--|
| Sub-Activity 1.3: Provide extension service to farming groups for sustainable commercial-level cassava crop production | | | |
| Key Activity 2: Promote development of 20,000 ha of land for cassava production over five years | | | |
| Sub-Activity 2.1: Provide specialized training to prepared 20000 ha for cassava production | | | |
| Sub-Activity 2.2: Provide technical and management training to 20000 (SMEs) in business, technical, partnership, entrepreneurship, and financial skills (local and external) | | | |
| Sub-Activity 2.3: Establish six major cassava cuttings multiplication sites (10 hectares each) | | | |
| Sub-Activity 2.4: Develop 20000 hectares of secondary forestland for mechanized cassava cultivation for five years | | | |
| Specific Objective four: Empower small holder farmer organizations and foster an entrepreneurship mindset | | | |
| OUTCOMES: 10% cassava-wheat-composite flow law legislated | | | |
| Key Activity 1: Support the National Cassava Sector Coordinating Committee to legislate and implement the Liberia 10% Cassava -Wheat-Composite Flour Law | | | |
| Sub-Activity 1.1: Promote the establishment of strong linkage between cassava producing cooperatives and processors for the legislation of the 10% cassava – wheat- composite flow law | | | |
| Specific Objective 5: Strengthening research and development | | | |
| Outcome: Adoption and upscale of innovative technology for improved/increased production and productivity enhanced | | | |
| Key Activity 1: Strengthen the capacity of public and private institutions to engage in the development of appropriate technologies | | | |
| Sub-Activity 1.1: provide training for public and private institute involve in research | | | |

19.8. Budget and Action Plan

Table 41: Budget and action plan for cassava value chain

Action Plan

| S/N | Activity/Item | Unit | Quantity | Unit Cost (USD) | Amount (USD) |
|---|--|----------------|----------|-----------------|----------------------|
| Deliverable I: Improve infrastructure along the cassava value chain in USD | | | | | |
| 1 | ACTIVITIES | | | | |
| 1.1 | Key Activity 1.1: Encourage private-sector investment in the establishment of five large-scale cassava processing plant for transformation of fresh cassava roots into starch and other products. <i>22,045,000.00</i> | | | | |
| 1.1.1 | Sub-Activity 1.1.1: : Land acquisition and preparation at five sites for the construction of large scale cassava processing plant | Hectare | 20000 | 1,062.25 | 21,245,000.00 |
| 1.1.2 | Sub-Activity 1.1.2: Construction of 5 new cassava processing factory | Facility | 5 | 30,000.00 | 150,000.00 |
| 1.1.3 | Sub-Activity 1.1.3: Procure and install processing equipment (according to spec.) in the 5 new processing plant | Set (complete) | 5 | 40,000.00 | 200,000.00 |
| 1.1.4 | Sub-Activity 1.1.4: Provide financing support (grant, loan or both) to purchase raw materials and cover 12 months operation cost for the five-processing plant | Lumpsum | | | 300,000.00 |
| 1.1.5 | Sub-Activity 1.1.4: Create appropriate business environment to attract private – sector investment in large commercial cassava production and value addition in six major production counties | Lumpsum | 1 | 500,00 | 50000 |
| 1.1.6 | Sub-Activity 1.1.5: Creation of cassava aggregation units to facilitate and like fresh cassava root producers to processors | Lumpsum | 1 | 100,000 | 100,000 |
| | Sub-total | | | | <i>22,045,000.00</i> |
| 1.2 | Key Activity 1.2: Support 15 mechanized large-scale cassava production to promote sedentary cassava production practices \$125,000 | | | | |
| 1.2.1 | Sub-Activity 1.2.1: Land acquisition and preparation at five sites for the construction of mechanized large scale cassava processing plant | Lumpsum | 5 | 5,000.00 | 25,000.00 |
| 1.2.2 | Sub-Activity 1.2.2: Strengthen the capacity of the management team based on identified gaps | Lumpsum | | | 100,000.00 |

| | | | | | |
|---|---|-----------------|----|------------|------------|
| | Sub-total | | | | 125,000 |
| 1.3 | Key Activity 1.3: Strengthen five cassava product market and marketing infrastructures \$2,000,000 | | | | |
| 1.3.1 | Sub-Activity 1.3.1: Modernized five cassava product market across the country | Lumpsum | 5 | 5,000.00 | 375,000.00 |
| 1.3.2 | Sub-Activity 1.3.2: Procure and install processing equipment (according to spec.) in the 5 modernized market | Facility | 5 | 35,000.00 | 525,000.00 |
| 1.3.3 | Sub-Activity 1.3.3: Financing support (grant, loan, or both) to purchase raw cassava and cover 12 months operation cost for the five sites | Unit (complete) | 12 | 50,000.00 | 600,000.00 |
| 1.3.4 | Sub-Activity 1.3.4: Promote technology adoption and upscale by stakeholders through training and knowledge exchange scheme (local & external) | Entrepreneur | 5 | 100,000.00 | 500,000 |
| | Sub-total | | | | 2,000,000 |
| Deliverable II: Improve access to finance along the cassava value chain | | | | | |
| 2 | ACTIVITIES | | | | |
| 2.1 | Key Activity 2.1: Provide smallholder farmers access to finance by providing grant to improve their capacity to operate competitively in the cassava value chain | | | | |
| 2.1.1 | Sub-Activity 2.1.1: Building the capacity 50 farmers groups and 25 SMEs to interact with financial service providers | Lumpsum | 5 | 15,000.00 | 75,000.00 |
| | <i>Sub-total</i> | | | | 75,000.00 |
| 2.2 | Key Activity 2.2: Provide smallholder farmers management and financial training tools and establish a more reliable linkage with sellers and buyers. \$180,000.00 | | | | |
| 2.2.1 | Sub-Activity 2.2.1 Provide managerial and financial training for 50 farmers groups and 25 SMEs to access (grant, loan or both) for the purchase of inputs covering 12 months operation cost | Lumpsum | 1 | 30000.00 | 30,000.00 |
| | Sub-total | | | | 180,000.00 |
| 3.1 | Deliverable III: Develop and strengthen access to inputs and extension and advisory service to ensure adequate sustainable production and processing along the value chain | | | | |

| | | | | | |
|--|---|---------|---|-----------|---------------------|
| 3.1.2 | Key Activity 3.1: Develop and strengthen access to inputs and extension and advisory service to ensure adequate sustainable production and processing along the value chain 900,000.00 | | | | |
| 3.1.3 | Sub-Activity 3.1.1: Establish 10,000 cassava production units (cooperatives) with 20 members each cultivating 2 hectares in six designated counties | Lumpsum | | | 250,000.00 |
| 3.1.4 | Sub-Activity 3.1.2: Provide productive input packages to smallholder farmers across the country | Lumpsum | | | 600,000 |
| 3.1.5 | Sub-Activity 3.1.3: Provide extension service to farming groups for sustainable commercial-level cassava crop production | Lumpsum | | | 50,000 |
| | <i>Sub-total</i> | | | | <i>900,000.00</i> |
| 3.2 | Key Activity 3.2.3: Promote development of 20,000 ha of land for cassava production over five years \$1,600,000 | | | | |
| 3.2.1 | Sub-Activity 3.2.1: Provide specialized training to prepared 20000 ha for cassava production across the country (15 counties) | Lumpsum | 1 | 50,000.00 | 500,000.00 |
| 3.2.2 | Sub-Activity 3.2.2: Provide technical and management training to 20,000 (SMEs) in business, technical, partnership, entrepreneurship, and financial skills (local and external) | Lumpsum | 1 | 350,000 | 350,000 |
| 3.2.3 | Sub-Activity 3.2.1: Develop 20000 hectares of secondary forestland for mechanized cassava cultivation for five years | Lumpsum | | | 200,000 |
| 3.2.4 | Sub-Activity 3.2.2: Establish six major cassava cuttings multiplication sites (10 hectares each) | Sites | 6 | 30000 | 180000 |
| | <i>Sub-total</i> | | | | <i>1,230,000.00</i> |
| Deliverable IV: Empower small holder farmer organizations and foster an entrepreneurship mindset | | | | | |
| 4 | ACTIVITIES | | | | |
| 4.1 | Key Activity 4.1: Support the National Cassava Sector Coordinating Committee to legislate and implement the Liberia 10% Cassava -Wheat-Composite Flour Law | | | | |
| 4.1.1 | Sub-Activity 4.1.1: Promote the establishment of strong linkage between cassava producing cooperatives and processors for the legislation of the 10% cassava –wheat- composite flow law | Lumpsum | 5 | 20,000.00 | 100,000.00 |

| | | | | | | | |
|--|---|---------|--|--|--|--|---------------------|
| | <i>Sub-total</i> | | | | | | 100,000.00 |
| 5 | Deliverable V Strengthening research and development | | | | | | |
| 5.1 | Activity | | | | | | |
| 5.1.1 | Key Activity 5.1: Strengthen the capacity of public and private institutions to engage in the development of appropriate technologies | | | | | | |
| 5.1.2 | Sub-Activity 5.1.1: Provide training for public and private institute involve in research | Lumpson | | | | | 300,000 |
| 5.1.3 | Sub-Activity 5.1.1: Conduct and disseminate research on novel technology | Lumpson | | | | | 200,000 |
| | <i>Sub-total</i> | | | | | | 500,000 |
| GRAND TOTAL (Total Investment Cost) | | | | | | | \$27,230,000 |

19.9. Result Framework

Table 42: Result framework for the cassava value chain

| Indicator | Baseline | Intermediate Targets | | | | | End Target |
|--|----------|----------------------|------------|------------|------------|------------|------------|
| | | Y-1 | Y-2 | Y-3 | Y-4 | Y-5 | |
| Area under cultivation - new planting (Number –Ha.) | 0 | 1000 | 500 0 | 500 0 | 500 0 | 400 0 | 20000 |
| Area rehabilitated – old farms (Number) | 0 | 100 | 100 | 100 | 100 | 100 | 500 |
| Farmers adopting innovative technologies - women & youth (Number) | 0 | 1000 | 500 0 | 500 0 | 500 0 | 400 0 | 20000 |
| Yield of farms – supported farmers (Percentage change) | 12t/ha | 16t/h a | 20t/ ha | 22t/ ha | 25t/ ha | 27t/ ha | 27t/ha |
| Volume of sales of cassava produced by supported farmers (Percentage change) | 0 | 20% | 25% | 30% | 40% | 50% | 70% |
| SMEs adding value to cassava disaggregated by cassava derivatives (Number) | 0 | 100 | 200 | 250 | 300 | 400 | 500 |
| Component 1: Improve infrastructure along the cassava value chain | | | | | | | |
| Private-sector investment establishment (number) | 0 | 1 | 1 | 1 | 1 | 1 | 5 |
| Number of large-scale cassava processing plant constructed | 0 | 1 | 1 | 1 | 1 | 1 | 5 |
| Number of sites that have procured and installed processing equipment (according to spec.) | 0 | 1 | 1 | 1 | 1 | 1 | 5 |
| Processing plant provided financing support (Number) | 0 | 1 | 1 | 1 | 1 | 1 | 5 |
| Component 2: : Improve access to finance along the cassava value chain | | | | | | | |

| | | | | | | | |
|---|---|------|----------|----------|----------|----------|-------|
| Farmers and SMEs capacity built to access finance | 0 | 15 | 15 | 15 | 15 | 15 | 75 |
| Smallholder farmers provided management and financial training tools to establish a more reliable linkage with sellers and buyers | 0 | 15 | 15 | 15 | 15 | 15 | 75 |
| Component 3: Develop and strengthen access to inputs and extension and advisory service to ensure adequate sustainable production and processing along the value chain | | | | | | | |
| PPP established and functioning – disaggregated by category (Number) | 0 | 10 | 10 | 10 | 10 | 10 | 50 |
| Number of farming group registered | 0 | 10 | 10 | 10 | 10 | 10 | 50 |
| Entrepreneurship skills training for beneficiaries – disaggregated by producers, aggregators, processors, and marketeers (Number) | 0 | 5 | 5 | 5 | 5 | 5 | 25 |
| Number of farmers provided productive input packages | 0 | 5000 | 500 0 | 500 0 | 500 0 | 500 0 | 25000 |
| Value addition FBOs, cooperatives, & SMEs adopting improved technologies (Number) | 0 | 15 | 15 | 15 | 15 | 15 | 45 |
| Component 4: Empower small holder farmer organizations and foster an entrepreneurship mindset | | | | | | | |
| Linkage created between cassava producing cooperatives and processors for the legislation of the 10% cassava –wheat- composite flow law | 0 | 1 | 1 | 1 | 0 | 0 | 3 |
| Component 5: Strengthening research and development | | | | | | | |
| Number of research institute / Universities provided training | 0 | 5 | 5 | 5 | 5 | 5 | 25 |
| Access to finance - disaggregated by Research institute, University (Number) | 0 | 5 | 5 | 5 | 5 | 5 | 25 |

XX. MAIZE VALUE CHAIN

20.1. CONTEXT

With approximately 70% of its populace relying on agricultural activities, Liberia places significant emphasis on agriculture for its economic advancement. Subsistence farming constitutes about 35% of the sector, with rice and cassava serving as primary dietary staples (Ministry of Finance and Development Planning, 2017). Livestock holds a crucial role in the agricultural economy, providing sustenance, nutrition, income, savings, draft power, manure, transportation, and various social and cultural benefits. Despite these contributions, one of the primary challenges hindering animal production and productivity, especially in poultry farming, is the insufficient supply of feed. In rural areas, poultry feed comprises a mix of scattered grains from flour mills, leftover grains, broken rice, kitchen scraps, grass, insects, and leftover boiled rice. Additionally, imported materials such as wheat, rice polish, fishmeal, oyster shells, common salt, and vitamin-mineral premixes are commonly utilized in poultry feed formulations.

Maize is widely utilised in commercial poultry diet across the world because of its high-calorie content and ease of digestion. Harvested green, maize is produced in a variety of agroecological zones in Liberia and consumed as a standard dish. However, due to limited production, Liberia had to import an estimated 15,500 mt of maize in 2015, mainly from neighbouring countries². This reliance on expensive imported feeds limits local farmers' ability to compete with meat and egg imports.

Fascinatingly, maize production in Liberia has shown remarkable growth, surging from 11,500 tons in 1973 to 24,853.14 tons by 2022, representing an average annual growth rate of 1.63%. This progression underscores the steady expansion of maize cultivation within the country, reflecting the resilience and adaptability of agricultural practices over the decades. Moreover, this increase in maize output holds promising implications for food security, economic development, and agricultural sustainability in Liberia.

However, to enhance sustainable maize production and value chain development, which will provide consistent and affordable sources of corn for feed production, hence increasing the profit margins of both feed producers and poultry farmers, as well as the viability of domestic chicken production. With more competitive farmers, local production of affordable fresh eggs and meat can generate sustainable livelihoods and enhance food and nutrition security in Liberia. The value chain will contribute to efforts that will ensure food and nutrition security, as well as to improve the livelihoods of the population in targeted counties, especially in the wake of more than 5 million population and more than half being youth.

Enhancing the institutional capacity of already existing key stakeholders such as the Ministry of Agriculture (MoA), the Communal Farming Division of the Ministry of Internal Affairs (MIA), the Liberia Agriculture Commercialization Regulatory Authority (LACRA), the

² FAO/WFP. 2015. *Crop and food security assessment*

National Standard Laboratory (NSL), the National Investment Commission (NIC), and the Central Agricultural Research Institute (CARI) is paramount for ensuring the development and sustainability of the value chain. These institutions will prioritize the enhancement of the technical skills of farmers and producers. Integration of the value chain into both national and local programming efforts of MoA, MIA, CARI and other major stakeholder programs will be essential to foster comprehensive and coordinated support for agricultural development initiatives across Liberia, including maize development. This concerted institutional effort will pave the way for the effective implementation of strategies aimed at advancing maize value chain development and ensuring long-term sustainability in the agricultural sector.

The development of the maize value chain will harness opportunities that will maintain maize productivity and increase crop and livestock production, in line with the ARREST agenda being developed and the Liberia Rising Vision 2030 by thereby contributing to Sustainable Development Goal (SDG) 2, which is geared towards ending hunger by 2030. By ensuring farmers have stable livelihoods and access to affordable livestock feed, this project contributed to SDG 1, which aims to eradicate poverty.

20.2. JUSTIFICATION OF THE MAIZE VALUE CHAIN PROGRAM

Globally, maize holds significant importance within the broader agricultural landscape. Maize, also known as corn, is a cereal crop and staple food to many and plays a crucial role in food security, nutrition, and economic development for more than 1.2 billion people, especially in Southern America and Sub-Saharan Africa. Though widely cultivated, maize was first sown on the Sub-Saharan African soil in the 1500s, but today it has over fifty varieties and has since become one of the dominant food crops.

In Liberia, and like many other developing nations, maize is consumed as a vegetable although it is a grain crop. All parts of the crop can be used for food and non-food products. In industrialized countries, maize is largely used as animal feed and as a raw material for industrial products. This gives maize a huge potential for global demand.

Evolution of the value chain: Production and Productivity Trends Over the Last 5 Years

Maize, originating from Mexico and later domesticated by Native Americans, has become a globally significant crop. In 2018, global maize production exceeded 1,118 million tons, with major producers including the United States, China, Brazil, and India. Maize exports totalled over US\$33.6 billion, with top exporters including the United States, Argentina, and Brazil, while major importers included Japan, Mexico, and South Korea.

Changes in agricultural policies, climate conditions, market demands, and prices influence maize production worldwide. Despite a projected slight decline in production in 2019, overall utilization remains stable. Maize, with its high starch content and nutritional value, serves as a vital source of energy, protein, vitamins, minerals, and fibre.

Maize's global production exceeded 1147.7 million metric tons from over 170 countries, covering 193.7 million hectares and yielding an average of 5.75 metric tons per hectare as

reported in the FAOSTAT, 2020. Notably, in West Africa, Nigeria alone contributes over 60% of the region's annual maize output. Furthermore, maize serves diverse purposes globally, with 61% allocated for feed, 17% for food, and 22% for industrial applications, highlighting its multifaceted importance and the potential for investment returns across various sectors.

The versatility of maize allows for various food and industrial applications, including livestock feed, human consumption, and the production of starch, sweeteners, oil, beverages, and fuel. In Africa, maize plays a crucial role in the regional diet, with around 95% of production used for human consumption. The increasing utilization of maize for fuel production underscores its growing importance in various industries. Therefore, investing in maize value chain development is justified due to its widespread usage, nutritional benefits, and economic significance across sectors.

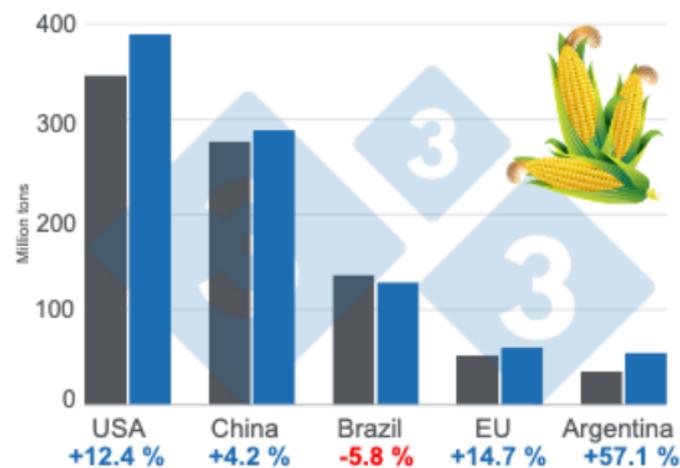


Figure 1: Global Maize Production in 2023

20.3. THE THEORY OF CHANGE OF THE MAIZE VALUE CHAIN

Limited Access to Maize Feed

The below table highlights limited access to maize feed as a significant bottleneck hampering the maize value chain in Liberia. This limitation affects the market by contributing to elevated feed costs, resulting in compromised animal health and nutrition. Consequently, this situation contributes to higher meat prices, a primary protein source in the non-coastal regions of Liberia. To address this challenge, initiatives focus on several strategies, including promoting on-farm feed production through training and capacity building, leveraging farmers' cooperatives, establishing community-based feed processing facilities, facilitating access to affordable feed ingredients, and enhancing distribution infrastructure. By implementing these measures, an improvement in the access to affordable and high-quality maize feed for livestock and poultry farmers, enhance productivity and profitability within the livestock sector, reduce production costs, and ultimately enhance food security and livelihoods among farming communities.

Unimproved Planting Materials

The below table acknowledges that the utilization of unimproved planting materials results in low or suboptimal yields, heightened susceptibility to pests and diseases, and decreased resilience to environmental pressures as seen in the maize value chain in Liberia. Consequently, farmers experience reduced productivity and income, thereby impeding overall agricultural advancement. Similar to other value chains, maize production in Liberia faces challenges attributed to limited access to superior varieties and cumbersome limitations within the national seed distribution systems. However, addressing this issue entails promoting the advancement and acceptance of improved planting materials that exhibit resilience against pests, diseases, and environmental pressures. This necessitates the strengthening of capacity in maize research and development for the creation and dissemination of superior varieties, as well as the enhancement of community-based adoption and selection processes for these improved maize varieties.

Lack of Value Addition

The table highlights the lack of value addition as a significant plague within the maize value chain. Much like other food crops, maize's potential remains untapped without value addition, constraining its market viability and profitability for farmers and stakeholders. This situation arises from insufficiencies in processing infrastructure, insufficient technical expertise among farmers and processors, and prevailing market dynamics that favour raw maize over value-added products, exacerbated by Liberia's high hunger index. To address this challenge, the initiative aims to facilitate the development of affordable and gender-friendly processing equipment and machinery for maize feed production. Additionally, it seeks to provide comprehensive training and technical support to farmers and processors on value-addition techniques for maize feed. These efforts hold promise for fostering sustainable growth and development within the maize value chain, stimulating job creation and economic progress in rural areas, improving food security and nutritional outcomes, and fortifying resilience against market fluctuations.

Poor Market Linkages

Insufficient market linkages represent a significant bottleneck in the maize value chain, stemming from inadequate connections among producers, buyers, and other market participants. This results in inefficiencies, limited market access, and diminished profitability for maize farmers. The challenges are compounded by physical barriers such as deficient infrastructure, information gaps regarding market demand and pricing, and weak coordination among stakeholders along the value chain. Nonetheless, this initiative seeks to address these issues by promoting quality assurance and certification standards for maize feed production to bolster consumer trust and market acceptance. Additionally, it aims to establish a market system platform providing maize prices and demand trends to stakeholders in the maize value chain. Furthermore, it advocates for the inclusion of maize and its value-added products in the annual agriculture fair and national dietary plan. These efforts are anticipated to augment market access for maize farmers, enhance market information accessibility, improve coordination among value chain actors, and broaden market prospects for maize products.

Table 43: Theory of Maize Value Chain Program

| Main issues | Transformation or change to achieve | Expected results | Main agents of transformation or change | Driving assumptions | Impacts and links with Government global policies |
|------------------------------|---|--|--|---|--|
| Limited access to maize feed | <ul style="list-style-type: none"> - Facilitate the establishment of small-scale and community-based feed processing facilities - Provide technical training and facilitate support to farmers on on-farm feed production techniques - Facilitate the harnessing of farmers cooperatives to enable farmers collectively purchase feed ingredients in bulk at discounted rates - Embed in all extension modules and farmers field school syllables that educate farmers on | <ul style="list-style-type: none"> - Availability of affordable feed - Increased availability of feed ingredients - Animal nutrition, health, and productivity improved - Self-sufficiency increased - Feed production costs reduced - Prices per unit lowered - Knowledge sharing, mutual support, and collective decision-making increased - Profitability and sustainability of | Ministry of Agriculture, National Investment Commission, University of Liberia, NGOs, Private Sector Actors and Investors, Farmers | <ul style="list-style-type: none"> - Government of Liberia political will for agricultural development through budget increment for the agriculture sector and type of bilateral agreements sought - Commitment of technical and financial partners - Private sector interest investing - Involvement of young people and women | <ul style="list-style-type: none"> - ARREST Agenda, Liberia Rising Vision 2030, - UN SDGs 2030, AU Agenda 2064 |

| | | | | | |
|-------------------------------|---|---|--|---|--|
| | <p>efficient feeding practices, feed management, and nutritional requirements for poultry and fish</p> <ul style="list-style-type: none"> - Facilitate private sector investment in large feed companies' establishment | <p>agricultural enterprise</p> <ul style="list-style-type: none"> - Increased sustainable production systems increase | | | |
| Unimproved planting materials | <ul style="list-style-type: none"> - Promote the development and adoption of improved planting materials that are resilient to pests, diseases, and environmental stresses - Facilitate community farm adoption of improved planting materials - Strengthen capacity in maize research and development to develop and disseminate improved varieties | <ul style="list-style-type: none"> - Quality maize varieties developed - Superior varieties adopted and promoted - New varieties or planting materials accepted - Research of maize increased | Central Agricultural Research Institute, Agriculture Colleges and Universities and Ministry of Agriculture | <ul style="list-style-type: none"> - Government of Liberia political will for agricultural development through budget increment for the agriculture sector and type of bilateral agreements sought - Commitment of technical and financial partners - Commitment of Agriculture colleges and universities - Involvement of young people and women | <ul style="list-style-type: none"> - ARREST Agenda, Liberia Rising Vision 2030, - UN SDGs 2030, AU Agenda 2064 |

| | | | | | |
|------------------------|---|--|---|--|--|
| Lack of value addition | <ul style="list-style-type: none"> - Facilitate the fabrication low cost but gender friendly of processing equipment and machinery for maize feed production - Promote training and capacity building for farmers on value addition and agri businesses techniques of maize into feed | <ul style="list-style-type: none"> - Machines or equipment prices dropped - Training of the value addition increased - Innovative processing methods adopted - Product quality improved - Growth and profitability of the maize feed sector sustained | <p>Ministry of Agriculture, Central Agricultural Research Institute, NGOs, Private Sector Actors and Investors, Farmers</p> | <ul style="list-style-type: none"> - Technical and financial support for value addition infrastructure - Adoption of easy-to-use equipment across the country - Consideration of young people and women | <ul style="list-style-type: none"> - ARREST Agenda, Liberia Rising Vision 2030, - UN SDGs 2030, AU Agenda 2064 |
| Poor market linkages | <ul style="list-style-type: none"> - Promote quality assurance and certification standard for maize feed production to enhance consumer trust and market acceptance | <ul style="list-style-type: none"> - Maize and its feed products production increased - Demand of maize feed products on the market sustained | <p>Ministry of Agriculture, Ministry of Commerce and Industry, Liberia National Standards Laboratory, Liberia Agriculture</p> | <ul style="list-style-type: none"> - Availability of resources for local farmers to access larger market - Commitment to increasing productivity. | <ul style="list-style-type: none"> - ARREST Agenda, Liberia Rising Vision 2030, - UN SDGs 2030, AU Agenda 2064 |

| | | | | | |
|--|---|---|--|---|--|
| | <ul style="list-style-type: none"> - Promote the establishment of a market system platform that provide maize prices and demand trends to maize value chain stakeholders - Include maize and its value-added products in annual agriculture fair and promote maize in national dietary plan | <ul style="list-style-type: none"> - Consumer trust and market acceptance of maize feed products increased - Decision-making, better market access improved - Competitiveness for maize value chain stakeholders enhanced - Market recognition, consumer awareness, and business opportunities for maize producers and value-added product processors increased | <p>Commodity Regulatory Authority, Central Agricultural Research Institute, Private Sector Actors and Investors, Farmers</p> | <ul style="list-style-type: none"> - Technological advancements in marketing | |
|--|---|---|--|---|--|

20.4. THE DEVELOPMENT OBJECTIVE OF THE MAIZE VALUE CHAIN

The development objective of the maize value chain is:

- To enhance the efficiency and profitability of the maize value chain, with a focus on reducing the cost of poultry and fishery production and increasing farm income.

Specific Objectives

- To increase maize yield by enhancing maize cultivation practices and productivity area through the implementation of advanced agricultural techniques, provision of high-quality inputs, and adoption of contemporary technologies, thereby elevating yields per hectare.
- To reduce input costs by implementing strategies that would lower the costs of essential inputs like seeds, fertilizers, and pesticides. This will include initiatives such as incentivizing bulk procurement or facilitating accessibility to cost-effective alternatives.
- To optimize post-harvest handling by improving techniques and infrastructure to mitigate losses, maintain quality, and facilitate a greater portion of maize feed reaching the market. This aims to benefit poultry and other animal farming sectors, curbing wastage and bolstering income.
- To facilitate Market Access by strengthening market linkages between maize farmers and poultry/fishery producers to improve market access, enhance bargaining power, and secure better prices for maize-based feed products.

20.5. EXPECTED OUTPUTS

- A total of 20,000 hectares of maize will be cultivated and developed, representing a significant expansion in maize production and agricultural land utilization.
- Job opportunities will be enhanced, agricultural productivity increased by at least 4 mt/ha, and economic growth within the maize value chain fostered.
- In the initial two years, there will be an upsurge of 15% in maize feed production, signifying a substantial improvement in feed output within a relatively short timeframe
- 75% of local farmers and community-based members intercropped and crop-rotating maize
- On-farm feed production increased adoption of by 30% in five years
- Affordable feed ingredients increased inputs in the first 3 year
- Reduced post-harvest losses by more than 10% in 3 years
- Annual average maize production increased from 1.63% to more than 5%

20.6. KEY STRATEGIC INTERVENTIONS

20.6.1. Promote on-Farm and Community Base Feed Production of by 30%

The MoA and its partners will empower farmers and community members to produce their feed using locally sourced ingredients, thereby reducing their reliance on expensive commercial feeds. It entails establishing a network of small-scale and community-based feed processing facilities across all five agricultural regions, totalling at least ten facilities. Furthermore, the intervention

includes providing comprehensive technical training and support to over 6,000 farmers nationwide in on-farm feed production techniques.

The MoA and its partners will support incorporating maize as priority into the intercropping and/or crop rotation initiatives of the national agroforestry program, aiming to enhance maize production and availability for local farmers and community members. Moreover, the initiative aims to foster collaboration among farmers by facilitating the formation of at least 20 farmer cooperatives spanning the five agricultural regions. These cooperatives will enable farmers to pool their resources and collectively purchase feed ingredients in bulk at discounted rates, enhancing their purchasing power and lowering input costs.

Additionally, the intervention will integrate education on efficient feeding practices, feed management, and nutritional requirements for poultry and fish into all extension modules and farmers' field school syllabi. This knowledge dissemination will empower farmers to optimize their feeding practices and enhance the quality of their livestock and fish stocks.

Lastly, the intervention seeks to attract private sector investments for the establishment of at least two large feed companies within the next five years. These companies will contribute to the local economy and provide farmers with access to a diverse range of high-quality feed products, further bolstering the sustainability and profitability of poultry and fishery production.

20.6.2. Facilitate Access to Affordable Inputs and Technology

The MoA and its partners will enhance the accessibility and affordability of essential agricultural inputs, including quality seeds, fertilizers, and pesticides, for farmers. It involves providing maize farmers with access to these inputs at subsidized rates through cooperatives or government programs. Additionally, the component will include initiatives that promote the development and adoption of improved planting materials that are resilient to pests, diseases, and environmental stresses. This involves facilitating the adoption of these improved materials at the community level and strengthening capacity in maize research and development to develop and disseminate improved varieties.

To ensure the widespread adoption of superior varieties, regional collaboration with at least three international research institutions is crucial to enhance maize research and development capacities within the National Agricultural Research System (NARS), including institutions like the Central Agricultural Research Institute (CARI) and other private or local stakeholders. The revitalization of the maize breeding program is a key aspect of this initiative, aiming to develop high-yielding varieties averaging at least 4 metric tons per hectare, surpassing the current national baseline of less than 3 metric tons per hectare and increasing cultivation area to 20,000 ha around Liberia, while also ensuring high nutritional content.

Furthermore, the MoA will ensure farmers source their planting materials, particularly seeds, from reputable sources such as CARI or certified seed companies with tested germination results from NARS-certified seed laboratories. Additionally, it seeks to enhance distribution networks by establishing at least one distribution center per region to facilitate the timely and efficient delivery

of inputs to farmers, ensuring they have access to the resources they need to optimize their agricultural productivity and improve their livelihoods.

20.6.3. Improve Post-Harvest Handling and Storage

The MoA and its partners will support to mitigation of post-harvest losses and establish a consistent supply of feed ingredients for poultry and fishery farming, thereby reducing production costs. It involves providing capacity building and technical support for improved post-harvest handling practices, including effective drying, storage, and preservation techniques for maize. Furthermore, the initiative endeavors to facilitate the development and dissemination of low-cost, gender-friendly processing equipment and machinery for maize feed production. It also aims to promote training and capacity building for farmers on value addition and agribusiness techniques for maize feed production and reducing post-harvest losses by more than 10% in 3 years

The MoA and its partners will engage with local fabrication companies across the country, encouraging at least 75% of them to manufacture low-cost and gender-friendly maize processing equipment. Additionally, it will oversee the establishment of 20 community-based processing facilities strategically located within the five agricultural regions, along with five solar-powered cold storage facilities.

Moreover, the MoA will promote ongoing research into new technologies and innovations in post-harvest handling and value addition. By staying abreast of advancements in the field, the MoA will ensure that farmers have access to the latest techniques and technologies to optimize their post-harvest processes and maximize the value of their maize crops.

20.6.4. Establish Market Linkages

The MoA and its partners will foster robust market connections between maize farmers and poultry/fishery producers, ensuring a consistent demand for maize feed. It encompasses initiatives aimed at promoting quality assurance and certification standards for maize feed production, thereby bolstering consumer trust and market acceptance.

Collaboration between key entities such as the National Standard Laboratory (NSL), Liberia Agriculture Commercialization Regulatory Authority (LACRA), and the Ministry of Agriculture (MOA) will be pivotal in developing and adopting standardized protocols for feed and other maize product development. This collaborative effort will establish a framework for ensuring the quality and safety of maize-based products, instilling confidence in consumers and facilitating market penetration.

Furthermore, the intervention will facilitate the establishment of a market system platform designed to disseminate maize prices and demand trends to stakeholders within the maize value

chain. This platform will serve as a central hub for information sharing, providing valuable insights into market dynamics and facilitating informed decision-making among stakeholders.

As part of this initiative, a maize sector steering committee comprising representatives from both the private and public sectors, as well as farmers and feed producers, will be established. This committee will collaborate with LACRA, MOA, and other relevant agencies to monitor and analyze maize market trends regularly, enabling proactive responses to emerging opportunities and challenges.

Moreover, the MoA will work in tandem with the National Investment Commission (NIC) to attract international investment for maize importation or investment that will develop large-scale feed production for exportation, thereby stimulating foreign exchange inflows and enhancing economic growth. By leveraging international partnerships and investment opportunities, this initiative aims to bolster the resilience and competitiveness of the maize value chain, ultimately contributing to sustainable agricultural development and economic prosperity.

The MoA and its partners will also ensure the inclusion of maize and its value-added products in the annual agriculture fair and promote maize in the national dietary plan connecting farmers with buyers, processors, and retailers, as well as promoting contracts or agreements for reliable maize supply at fair prices. By accessing stable markets, farmers can increase their income while reducing the risk of surplus production and price fluctuations.

20.7. BUDGET OF THE MAIZE VALUE CHAIN PROGRAM

Table 44: Summary budget of the maize value chain

| Components | Cost |
|---|-------------------|
| Promote On-Farm Feed Production | 1,200,000 |
| Facilitate Access to Affordable Inputs | 2,350,500 |
| Increase Production and Crop Area | 13,500,000 |
| Improve Post-Harvest Handling and Storage | 700,000 |
| Establish Market Linkages | 300,000 |
| Total | 18,050,500 |

20.8. RAPID COST BENEFITS

Table 45: Projected Income for Maize Value Chain

| Value Chain | Ton per hectare | Targeted Hectare | Price ton/cattle (in US) | per (in Total tons | Total Income USD |
|--------------------|------------------------|-------------------------|---------------------------------|---------------------------|-------------------------|
| Maize | 7.25 | 20000 | 290 | 145000 | 42, 050, 000 |

The total income projected for the period (2024 to 2029) stands at USD 42, 050, 000

The total investment needed for the 5 years is 18,050,500. The return on investment (ROI) of the Maize value chain amounts to 1,33%, generating a gross profit totalling USD 23, 999, 000.

XXI. VEGETABLE VALUE CHAIN

21.1. CONTEXT

Historically, Liberia's vegetable sector has been characterized by small-scale subsistence farming, with households growing vegetables primarily for their own consumption. Traditional farming methods, limited access to inputs and technology, and inadequate infrastructure constrained productivity and market participation.

In recent years, there has been a growing emphasis on introducing new technologies and agricultural practices to improve productivity and efficiency in vegetable production. This includes the adoption of improved seeds, irrigation techniques, pest management practices, and post-harvest handling methods.

With the expansion of urban areas and the growth of urban populations, there has been increasing demand for fresh vegetables in Liberia's urban markets. This has led to greater market integration, with farmers seeking to access urban markets and capture value along the vegetable value chain. Additionally, efforts have been made to add value to vegetable products through processing, packaging, and branding.

In 2022, 17,670 ha of farmland in Liberia was cultivated with assorted fresh vegetables resulting in an estimated annual production of 92,804 metric tons.³ However, demand for fresh vegetables still remain high, especially during the dry season when local production of vegetables plummets as a result of limited access to irrigation. During this time, demand is met by a spike in imports—especially from Guinea, Sierra Leone, and Cote d'Ivoire – and prices soar. Market prices for many vegetables, including chili peppers, tomatoes, “bitter ball,” eggplant, okra, and cabbage, are two to five times higher than during the rainy season.

This represents a significant opportunity for local farmers who can fulfill dry-season demand. Vegetable production for commercial sales can be a profitable commercial activity for small farmers, especially if simple, affordable, and effective irrigation systems can be developed and delivered.

The vegetable value chain in Liberia faces several key challenges that hinder its efficiency, productivity, and sustainability. Some of the key issues include:

Limited Infrastructure: Inadequate infrastructure, including roads, transportation networks, storage facilities, and market infrastructure, hampers the efficient movement of vegetables from farms to markets. These infrastructure challenges contribute to high post-harvest losses and reduce the overall competitiveness of Liberian vegetables in domestic and international markets.

Access to Inputs and Technology: Limited access to quality seeds, fertilizers, pesticides, and other agricultural inputs, as well as mechanization and modern farming technologies also

³ 2024, FAOSTAT

constrains productivity and efficiency in vegetable production. Smallholder farmers, in particular, face challenges in accessing inputs and adopting improved agricultural practices.

Poor Extension Services: Weak extension services and limited technical assistance to farmers inhibit the adoption of best practices in vegetable production, including crop rotation, integrated pest management, and soil conservation techniques. Improved extension services are needed to disseminate knowledge, provide training, and support farmers in adopting more sustainable farming practices.

Climate Change and Environmental Degradation: Liberia is vulnerable to climate change impacts, including erratic rainfall patterns, droughts, floods, and temperature fluctuations. These climate-related challenges, coupled with deforestation, soil erosion, and land degradation, threaten agricultural productivity and resilience, particularly in vegetable farming areas.

Pests and Diseases: Vegetable crops in Liberia are susceptible to various pests and diseases, which can cause significant yield losses if not effectively managed. Limited access to affordable and effective pest control measures exacerbates this problem, leading to reduced crop yields and economic losses for farmers.

Market Access and Value Addition: Limited market access, particularly for smallholder farmers in rural areas, hinders their ability to sell vegetables at fair prices and access higher-value markets. Additionally, the lack of value-addition activities such as processing, packaging, and branding limits the potential for value creation along the vegetable value chain.

Policy and Regulatory Challenges: Inconsistent policies, regulatory barriers, and bureaucratic inefficiencies pose challenges to vegetable production and marketing in Liberia. Streamlining regulatory processes, improving market access, and creating an enabling policy environment are essential to support the growth and development of the vegetable sector.

Limited Financing and Investment: Access to finance and investment capital is a significant constraint for smallholder farmers and agribusinesses in Liberia. Limited access to credit, high interest rates, and stringent lending requirements hinder investment in vegetable production, processing, and marketing activities.

21.2. JUSTIFICATION OF THE VEGETABLE VALUE CHAIN

Addressing these key issues facing the vegetable value chain in Liberia requires a multi-stakeholder approach involving government agencies, development partners, private sector actors, civil society organizations, and local communities. Strategies to overcome these challenges may include investments in infrastructure development, extension services, research and development, climate-smart agriculture practices, value-addition activities, policy reform, and financial inclusion initiatives tailored to the needs of smallholder farmers and agribusinesses.

Vegetables are rich sources of essential nutrients such as vitamins, minerals, and dietary fiber. The importance of consuming a sufficient amount of fruit and vegetables daily for nutrition security and health

is now well recognized, and there is a growing interest in their inclusion in a balanced diet⁴. By improving the vegetable value chain, Liberia can ensure access to nutrient-dense foods for its population, particularly vulnerable groups such as children, pregnant or lactating women and the elderly, thereby improving overall nutrition and health outcomes.

Moreover, enhancing the vegetable value chain will create employment opportunities across various stages of the value chain including production, processing, marketing, and distribution. This will create jobs in farming, post-harvest handling, transportation, packaging, processing, retailing, and marketing, providing livelihood for both youth and adults in rural and urban areas.

Investing in the value chain will also allow Liberia to diversify its agricultural production away from traditional crops such as rice, rubber, and oil palm; and will reduce dependence on a few commodity crops, mitigate risk associated with price volatility and disease outbreaks, broaden agricultural trade, and provide alternative income sources for farmers. Additionally, vegetable value chain activities such as washing, sorting, packaging, and canning, will add value to raw produce and create economic diversification by developing downstream industries.

Adopting agroecological farming practices such as greenhouse production, hydroponics, organic farming, agroforestry, and integrated crop and livestock systems will contribute to improving soil health and biodiversity and reducing reliance on chemical inputs for vegetable production thereby improving nutrient cycling and reducing greenhouse gas (GHG) emissions⁵.

⁴ Peter, K.V. (2015). Horticulture for nutrition Security

⁵ Behera, S.R. *et al.* (2023). Vegetable chronicles: vegetable science compendium, pg. 265 -283

21.3. THE THEORY OF CHANGE OF VEGETABLE VALUE CHAIN

Table 46: Theory of change for the vegetable value chain program

| What are Main issues to be solved to boost the value chain development? | What will be the transformation/change to develop? | What will be the results coming out of these transformation/change? | Who will be the main agents of change or transformation? | What are the assumptions that will drive change (political will of the Government, commitment of technical and financial partners, participation of young people and women, etc.)? | What will be the impacts and links with the Global Government economic policies |
|--|---|--|--|--|--|
| <p>Limited access to improved inputs and technology:</p> <p>Limited access to improved inputs and technology hampers productivity and quality within the vegetable value chain in Liberia, hindering the sector's growth and competitiveness.</p> | <p>Strengthen functioning input supply chains: Partnering with input suppliers, agricultural cooperatives, and agro-dealers to improve the availability and accessibility of quality seeds, fertilizers, and pesticides in rural areas.</p> <p>Establishing input credit schemes and subsidies to make inputs more affordable and accessible to</p> | <p>Improved access to improved inputs and technology.</p> <p>Increased agricultural productivity and income.</p> <p>Adoption of sustainable farming practices and technologies</p> | <p>MOA Departments of Technical Services and DRDRE, CARI, Input suppliers, MOCI, Agriculture Extension Service Providers, Vegetable value chain actors</p> | <p>The government, private sector, and development partners are willing to invest in initiatives to improve access to inputs and technology</p> | <p>Improved access to inputs and technology contributes to higher agriculture productivity and results in poverty reduction, food security, and sustainable development in Liberia</p> |

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| | <p>smallholder farmers.</p> <p>Training farmers on proper input selection, usage, and management practices to maximize the effectiveness of inputs and minimize wastage.</p> <p>Enhance technology adoption by farmers:</p> <p>Introducing and promoting appropriate agricultural technologies, tools, and machinery suitable for vegetable production in Liberia.</p> <p>Providing training, demonstrations, and extension services</p> | | | | |
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| | <p>to farmers on the use of modern farming equipment, irrigation systems, and precision agriculture techniques.</p> <p>Facilitating farmer-to-farmer knowledge exchange and peer learning networks to encourage the adoption of new technologies and best practices.</p> | | | | |
| <p>Limited financing and investment:</p> <p>Limited financing and investment options hinder the development and growth of the vegetable value chain in Liberia, restricting opportunities for smallholder farmers and entrepreneurs to access capital and</p> | <p>Facilitate investment promotion initiatives to attract domestic and foreign investors interested in financing projects and ventures within the vegetable value chain, including production, processing, and marketing, and</p> | <p>Increased availability and accessibility of financial services and investment opportunities for stakeholders in the vegetable value chain.</p> <p>Strengthened financial management capacities and practices among</p> | <p>MOA, MFDP, CBL, NIC, CDA, Commercial Banks, RCFIs, Private Investors, Vegetable value chain actors</p> | <p>Strong commitment by government and development partners to mobilize financing and investment opportunities for the agriculture sector.</p> <p>Young people and women are actively engaged in the vegetable sector as producers, entrepreneurs, and decision-makers, contributing to its growth, innovation, and inclusivity.</p> | <p>Improved financing and investment in the vegetable value chain contributing to economic development, social inclusion, and sustainable agriculture in Liberia</p> |

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| <p>expand their operations.</p> | <p>infrastructure development</p> <p>Develop and promote tailored financial products and services, such as credit, savings, insurance, and leasing, designed to meet the needs of vegetable farmers and value chain actors</p> <p>Establish risk mitigation mechanisms, such as loan guarantees, credit insurance, and investment funds, to reduce the perceived risks associated with investing in the vegetable value chain and encourage financial institutions and investors to participate.</p> | <p>vegetable farmers and value chain actors.</p> <p>Expanded investment in production, processing, marketing, and infrastructure within the vegetable value chain.</p> | | | |
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| | <p>Provide training and capacity-building programs to improve financial literacy and management skills among stakeholders in the vegetable value chain, including smallholder farmers, agribusinesses, and entrepreneurs</p> <p>Promote value chain financing approaches that link financing to specific stages of the vegetable value chain, such as input financing, production financing, and market financing, to address the diverse financing needs of stakeholders along the value chain.</p> | | | | |
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| <p>Inadequate Infrastructure:</p> <p>Inadequate infrastructure, including transportation networks, storage facilities, and market infrastructure, hampers the efficiency, productivity, and competitiveness of the vegetable value chain in Liberia, limiting market access and opportunities for smallholder farmers and value chain actors.</p> | <p>Mobilize resources and investments to finance infrastructure projects that address identified gaps and constraints in the vegetable value chain.</p> <p>Invest in post-harvest infrastructure, such as cold storage facilities, packing houses, and processing plants, to reduce post-harvest losses, maintain product quality, and extend the shelf-life of vegetables.</p> <p>Enhance market infrastructure, including wholesale markets, market stalls, and market information systems, to improve market access,</p> | <p>Improved access to markets, inputs, and services for vegetable producers and value chain actors.</p> <p>Reduced transportation costs, post-harvest losses, and supply chain inefficiencies within the vegetable value chain.</p> <p>Enhanced competitiveness, productivity, and resilience of the vegetable value chain through improved infrastructure.</p> <p>Increased investment, employment, and economic opportunities in infrastructure development initiatives.</p> | <p>MOA, MFDP, MPW, Donor organizations, Private sector actors, Vegetable value chain actors</p> | <p>There is political will and commitment from government authorities to invest in agriculture infrastructure development and address gaps in the vegetable value chain.</p> <p>Adequate resources and technical expertise are available to plan, finance, and implement infrastructure projects within the vegetable value chain.</p> <p>Stakeholders, including youth and women in the vegetable value chain are willing to collaborate and contribute to infrastructure development initiatives.</p> | <p>Improved infrastructure along the vegetable value chain, contributing to economic development and livelihood improvement as enshrined in the national development agenda</p> |
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| | transparency, and efficiency for vegetable producers and buyers. | | | | |
| <p>Limited market information</p> <p>Limited market access and information, hindering the efficiency, transparency, and competitiveness of the vegetable value chain in Liberia, restricting market participation, increasing transaction costs, and hindering informed decision-making by stakeholders.</p> | <p>Facilitate market linkages and market development initiatives to create demand for value-added vegetable products, promote consumer awareness, and facilitate market access for processed and branded products.</p> <p>Establish and/or strengthen market information systems to collect, analyze, and disseminate market data on prices, supply, demand, trends, and consumer preferences relevant</p> | <p>Strengthened market linkages and market development initiatives to promote the demand and consumption of value-added vegetable products.</p> <p>Improved access to timely, accurate, and relevant market information for stakeholders in the vegetable value chain.</p> <p>Enhanced market transparency, efficiency, and competitiveness facilitated by improved market information systems and services.</p> | <p>MOA, MOCI, CDA, Value chain actors</p> | <p>Government and development partners committed to developing infrastructure for collection and dissemination of market information.</p> <p>Commitment of stakeholders, including youth and women to utilize market information and contribute to market data collection.</p> | <p>Improved market access, price discovery, and profitability for smallholder farmers, traders, processors, and other value chain actors, resulting in diversified and inclusive economic growth and enhanced food security in rural and urban areas supported by vibrant and transparent vegetable markets.</p> |

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| | <p>to the vegetable value chain.</p> <p>Utilize ICT solutions, such as mobile phones, internet platforms, and SMS-based services, to deliver market information and extension services to stakeholders, particularly in remote and rural areas.</p> <p>Provide training and capacity-building programs to enhance the skills and knowledge of stakeholders in accessing, interpreting, and using market information effectively to make informed decisions and improve market participation.</p> | <p>Strengthened market linkages and coordination among value chain actors, leading to increased market participation and better integration into domestic and international markets.</p> | | | |
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|--|--|---|--------------------------------|--|---|
| | Facilitate networking and collaboration among stakeholders in the vegetable value chain, including farmers' associations, cooperatives, traders' groups, and market intermediaries, to share market information, coordinate activities, and leverage market opportunities. | | | | |
| Limited value addition and standardization Limited value addition in the vegetable value chain in Liberia results in missed opportunities for income generation, employment creation, and market diversification, hindering the sector's | Invest in infrastructure for value addition, including processing facilities, packaging centers, and quality control labs, to support small-scale processors and entrepreneurs. Provide technical assistance, training, | Expanded infrastructure and facilities for value addition, including processing plants, packaging centers, and quality assurance labs. Enhanced capacity and skills in value addition techniques, food processing, | MOA, MOCI, CDA, LIBA, NIC, FOs | Political will and commitment of government to improving value addition and standardization of the vegetable value chain. There are technical expertise and resources available to support value addition initiatives, including infrastructure, equipment, and skills. | Increased value addition along the vegetable value chain, contributing to increased income, employment, and livelihood opportunities for value chain stakeholders and diversified vegetable product offerings that meet consumer preferences, nutritional needs, and quality standards. |

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| <p>growth and competitiveness.</p> | <p>and capacity-building programs to stakeholders in value addition techniques, food safety standards, quality control measures, and product innovation.</p> <p>Provide business development services, mentorship, and financial assistance to small-scale processors and entrepreneurs to start or expand value addition enterprises, including access to credit, grants, and investment capital.</p> | <p>quality control, and product innovation.</p> <p>Increased adoption of value addition practices and technologies along the vegetable value chain.</p> | | | |
|------------------------------------|--|---|--|--|--|

21.4. THE DEVELOPMENT OBJECTIVE

The development objective of the vegetable value chain:

- To enhance productivity of the vegetable value chain and consumption to support economic growth, poverty reduction, and food security.

Specific Objectives

The specific objectives of the project include but aren't limited to the following:

- Increasing production and productivity of vegetables through enhanced access to improved inputs and technology
- To promote investment and financing along the vegetable value chain
- Improve infrastructure along the vegetable value chain
- Strengthen market linkages and value addition

21.5. EXPECTED OUTPUTS

It is expected that successful implementation of the plan will result in the following outcomes/results:

- 2000 hectares of farmland mechanically developed and outfitted with sprinkler or drip irrigation systems for cultivation of assorted vegetables (500 hectares each for tomatoes, peppers, beans and groundnuts)
- 10 greenhouses constructed on designated community college and university farms to be used for cultivation of high-value vegetables (cabbage, lettuce, collards, carrots, onions, tomatoes, and watermelons)
- 25% higher vegetable yields
- 50% reduction in post-harvest losses of vegetables
- 500 farmers provided access to agriculture machinery and other labor-saving technologies for land preparation and crop cultivation.
- 5000 farmers provided access to improved inputs and technology for vegetable production.
- 2000 SMEs in the vegetable value chain receiving investment financing.
- 5,000 vegetable value chain actors receiving financial literacy training.
- 20 stakeholder coordination events convened for vegetable value chain actors.
- 10 vegetable value addition and processing facilities developed.
- 1000 SMEs capacity strengthened in value addition, food safety, quality control and product innovation.
- 10 vegetable market infrastructure improved with cold storage, refrigerated trucks, washing and packaging centers and quality control labs.
- 2000 vegetables equipped with standard units of measurement.
- 10,000 vegetable producers provided access to market information.

21.6. KEY STRATEGIC INTERVENTIONS

21.6.1. Increasing production and productivity of vegetables through enhanced access to improved inputs and technology

The MoA will support the mechanized development of 2000 hectares of farmland outfitted with drip or sprinkler irrigation systems to be used for vegetable production; 500 hectares each for the cultivation of tomatoes, peppers, beans and groundnuts. Additionally, the project will partner with designated community colleges and universities for the construction and management of 10 greenhouses to be used for the cultivation of high-value vegetables such as cabbage, lettuce, collards, carrots, onions, tomatoes, and watermelons.

The MoA in partnership with CARI and the private sector will facilitate farmer's access to improved planting materials, tools, mechanization, and agriculture extension and advisory services delivery by strengthening functioning input supply chains. This will be achieved by partnering with input suppliers, agricultural cooperatives, and agro-dealers to improve the availability and accessibility of quality seeds, fertilizers, and pesticides in rural areas. The MoA will also support the establishment of input credit schemes and subsidies to make inputs more affordable and accessible to smallholder farmers and ensure increased productivity of vegetable crops.

The MoA will also promote the mechanization of vegetable production processes by supporting the establishment of public-private partnership arrangements with agricultural mechanization service providers. This will increase farmers' access to agriculture machinery and other labor-saving technologies for use in land preparation and crop cultivation processes which will support cultivation of larger farm areas and ensure increased production and productivity.

The MoA will support increased adoption and upscaling of agronomic technologies by promoting various good agricultural practices and climate-smart technologies which will contribute to enhancing the productivity of vegetable farms. Such technologies will include greenhouses, drip or sprinkler irrigation systems, and precision agriculture technology. The MoA will support relevant extension services providers to provide training and demonstrations to farmers on the use of modern farming equipment, irrigation systems, and precision agriculture techniques that will ensure higher productivity of their vegetable production operation. Additionally, the project will facilitate farmer-to-farmer knowledge exchange and peer learning networks to encourage the adoption of new technologies and best practices.

21.6.2. Improving investment and financing

Farmers' access to agriculture financing is limited particularly for smallholder vegetable producers. The MoA and its partners will facilitate investment promotion initiatives to attract domestic and foreign investors interested in financing projects and ventures within the vegetable value chain, including production, processing, marketing, and infrastructure development. The MoA will work with selected bank and non-bank financial institutions to develop and promote tailored financial products and

services, such as credit, savings, insurance, and leasing, designed to meet the needs of vegetable farmers and value chain actors.

The MoA and its partners will support the establishment of risk mitigation mechanisms, such as loan guarantees, credit insurance, and investment funds, to reduce the perceived risks associated with investing in the vegetable value chain and encourage financial institutions and investors to participate.

Training and capacity-building programs will be provided to improve financial literacy and management skills among stakeholders in the vegetable value chain, including smallholder farmers, agribusinesses, and entrepreneurs and promote value chain financing approaches that link financing to specific stages of the vegetable value chain, such as input financing, production financing, and market financing, to address the diverse financing needs of stakeholders along the value chain.

Additionally, the project will support the mobilization of resources and investments to finance infrastructure projects that address identified gaps and constraints in the vegetable value chain. These investments will be used to develop post-harvest infrastructure, such as cold storage facilities, packing houses, and processing plants, to reduce post-harvest losses, maintain product quality, and extend the shelf-life of vegetables. The project will also support the improvement of market infrastructure, including wholesale markets, market stalls, and market information systems, to improve market access, transparency, and efficiency for vegetable producers and buyers.

21.6.3. Improving value addition and marketing

The MoA and its partners will support investment in infrastructure for value addition, including processing facilities packaging centers, and quality control labs, to support small-scale processors and entrepreneurs. These resources and investments will be used to finance infrastructure projects that address identified gaps and constraints in the vegetable value chain. These investments will be used to develop post-harvest infrastructure, such as cold storage facilities, refrigerated trucks, packing houses, and processing plants, to reduce post-harvest losses, maintain product quality, and extend the shelf-life of vegetables. The MoA and its partners will also support the improvement of market infrastructure, including wholesale markets, market stalls, and market information systems, to improve market access, transparency, and efficiency for vegetable producers and buyers. These markets will be equipped with washing stations, cold storage facilities, and standard units of measurement to improve the grading and standardization of vegetable products.

Additionally, the MoA and CARI will support the provision of technical assistance, training, and capacity-building programs to stakeholders in value-addition techniques, food safety standards, quality control measures, and product innovation. The MoA will facilitate the provision of business development services, mentorship, and financial assistance to small-scale processors and entrepreneurs to start or expand value addition enterprises, including access to credit, grants, and investment capital.

The MoA and its partners will also facilitate market linkages and market development initiatives to create demand for value-added vegetable products, promote consumer awareness, and facilitate market access for processed and branded vegetable products by establishing and/or strengthening market information systems to collect, analyze, and disseminate market data on prices, supply, demand, trends,

and consumer preferences relevant to the vegetable value chain. To achieve this, the project will support the utilization of ICT solutions, such as mobile phones, internet platforms, and SMS-based services, to deliver market information and extension services to stakeholders, particularly in remote and rural areas.

Additionally, the MoA will support training and capacity-building programs to enhance the skills and knowledge of stakeholders in accessing, interpreting, and using market information effectively to make informed decisions and improve market participation; as well as facilitate networking and collaboration among stakeholders in the vegetable value chain, including farmers' associations, cooperatives, traders' groups, and market intermediaries, to share market information, coordinate activities, and leverage market opportunities.

21.7. BUDGET OF THE VALUE CHAIN PROGRAM

Table 47: Costs by Components and Key Result Areas

| Component | | Cost |
|--|--|-------------------|
| Component 1: Enhancing production and productivity of vegetables through enhanced access to improved inputs and technology (\$10 Million) | | |
| 1.1 | Mechanically develop 2000 hectares of farmland outfitted with drip or sprinkler irrigation systems for vegetable production | 10,000,000 |
| 1.2 | Construct 10 greenhouses on designated university campuses for cultivation of high-value vegetables | 300,000 |
| 1.3 | Provide 500 farmers access to agriculture machinery and other labor-saving technologies for use in land preparation and crop cultivation processes (<i>irrigation systems, greenhouses, precision agriculture, etc.</i>) | 2,000,000 |
| 1.4 | Provide access to improved planting materials, tools, and agrochemicals for 5,000 farmers | 2,000,000 |
| 1.5 | Enhance agriculture extension and advisory services delivery | 500,000 |
| Subtotal | | 14,800,000 |
| Component 2: Improving investment and financing (\$12 million) | | |
| 2.1 | Provide investment and financing to 2,000 vegetable value chain SMEs | 10,000,000 |
| 2.2 | Enhance financial literacy and financial management skills among 5,000 vegetable value chain stakeholders (smallholder farmers, agribusinesses, and entrepreneurs) | 500,000 |
| 2.3 | Convene 20 stakeholder coordination events (public-private partnership dialogues) | 500,000 |
| Subtotal | | 11,000,000 |
| Component 3: Improving value addition and marketing (10 million) | | |
| 3.1 | Develop 10 facilities for value addition and processing of vegetables (canning, drying, pickling, dicing, packaging quality control labs) | 2,000,000 |

| | | |
|-----|---|-------------------|
| 3.2 | Strengthen capacity of 1000 SMEs for improved value addition, food safety, quality control, and product innovation | 500,000 |
| 3.3 | Improve 10 vegetable markets with facilities for proper handling and storage (washing centers, cold storage facilities, refrigerated trucks, packaging centers, quality control labs) | 3,000,000 |
| 3.5 | Equip 2000 vegetables marketers with standard units of measurement | 200,000 |
| 3.5 | Improve market information dissemination and market access for 10,000 vegetable producers | 500,000 |
| | Subtotal | 6,200,000 |
| | TOTAL | 32,000,000 |

21.8. THE IMPLEMENTATION ARRANGEMENTS PLAN

The implementation arrangements plan outlines the structure, processes, and responsibilities for executing the transformational changes in the livestock sector of Liberia. Here's an overview of the key elements of the implementation arrangements plan:

Table 48: Implementation plan of the vegetable value chain

| Implementation Area | Description | Implementation agent(s) |
|---|---|--|
| Governance Structure: | Establish a multi-stakeholder governance structure comprising government agencies, development partners, private sector stakeholders, civil society organizations, and academic institutions. This structure will provide oversight, guidance, and coordination for the implementation of interventions in the vegetable sector. | Vegetable Technical Working Group (MOA, CDA, MOCI, NGO's, Academic Institutions) |
| Lead Implementing Agencies: | Designate lead implementing agencies responsible for coordinating specific thematic areas or components of the implementation plan. These agencies will oversee the planning, implementation, monitoring, and evaluation of activities within their respective mandates. | MOA |
| Technical Working Groups: | Form technical working groups composed of experts and stakeholders with relevant expertise in vegetable production, marketing, policy, research, and other key areas. These groups will provide technical input, develop action plans, and monitor progress towards achieving implementation targets. | MOA & Partners |
| Capacity Building and Training: | Conduct capacity building workshops, training programs, and knowledge exchange sessions to build the skills and capacity of stakeholders involved in implementing interventions in the vegetable sector. This will ensure that stakeholders have the necessary knowledge and expertise to effectively carry out their roles and responsibilities. | MOA & Learning Institutions |
| Resource Mobilization and Financing: | Develop a resource mobilization strategy to secure funding and resources for implementing interventions in the vegetable sector. This may involve leveraging domestic resources, engaging with development partners, mobilizing private sector investment, and accessing grant funding and concessional loans. | MOA & Partners |

| | | |
|---|---|-------------------------|
| Monitoring and Evaluation Mechanisms: | Establish robust monitoring and evaluation mechanisms to track progress, measure impact, and identify areas for improvement. This may include setting up monitoring indicators, conducting baseline assessments, collecting data, and conducting regular reviews and evaluations of implementation progress. | MOA & Partners |
| Communication and Stakeholder Engagement: | Develop a communication strategy to disseminate information, raise awareness, and engage stakeholders in the implementation of interventions in the vegetable sector. This may involve organizing workshops, seminars, and outreach events, as well as utilizing traditional and digital media channels for communication. | MOA Field Staff |
| Partnerships and Collaboration: | Foster partnerships and collaboration among government agencies, development partners, private sector stakeholders, civil society organizations, and academic institutions. This may involve establishing formal partnerships, joint initiatives, and collaborative projects to leverage expertise, resources, and networks for implementation. | Technical Working Group |
| Policy Advocacy and Institutional Strengthening: | Advocate for policy reforms and institutional strengthening measures to create an enabling environment for the development of the vegetable sector. This may involve engaging policymakers, advocating for supportive policies and regulations, and building the capacity of institutions responsible for livestock development. | MOA & Partners |
| Adaptive Management and Learning: | Adopt an adaptive management approach that allows for flexibility, learning, and adaptation based on feedback, evidence, and changing circumstances. This involves regularly reviewing progress, identifying lessons learned, and adjusting implementation strategies as needed to ensure the effectiveness and relevance of interventions | MOA & Stakeholders |

21.9. THE FINANCING PLAN

The financing plan outlines the financial resources needed to implement the transformational changes in the vegetable sector of Liberia. It details the sources of funding, allocation of resources, and strategies for mobilizing financing to support the implementation of interventions.

Table 49: Financing plan for the vegetable value chain

| Source of Funding | Amount (USD) | Purpose |
|---------------------------|--------------|--|
| GoL National Budget | 9,600,000 | <ul style="list-style-type: none"> Enhancing Production & Productivity |
| International Aid (grant) | 6,400,000 | <ul style="list-style-type: none"> Improving Value Addition & Marketing |
| International Aid (Loan) | 12,800,000 | <ul style="list-style-type: none"> Enhancing production and Productivity Investment Financing |
| Private Investment | 3,200,000 | <ul style="list-style-type: none"> Investment Financing Improving Value Addition and Marketing |

21.10. RAPID COST-BENEFIT ANALYSIS

A rapid cost-benefit analysis provides a preliminary assessment of the potential costs and benefits associated with implementing the transformational changes in the vegetable sector of Liberia. While a comprehensive cost-benefit analysis requires detailed data and rigorous analysis, a rapid assessment can help policymakers and stakeholders understand the potential economic implications of the proposed interventions. Here's a simplified outline of the rapid cost-benefit analysis:

Table 50: Cost and benefit analysis of Livestock value chain in Liberia

| Category (Targets) | Costs (') | Output | Benefits (') |
|---------------------------------|-------------------|-------------------|-------------------|
| Production (') | 14,000,000 | 31,500,000 | 17,500,000 |
| Infrastructures | 5,300,000 | 7,950,000 | 2,650,000 |
| Investment Financing | 10,000,000 | 22,500,000 | 12,500,000 |
| Policy & Regulatory Framework | 700,000 | 1,050,000 | 350,000.00 |
| Research & Capacity Development | 2,000,000 | 3,000,000 | 1,000,000 |
| Total | 32,000,000 | 66,000,000 | 34,000,000 |

21.11. RESULT FRAMEWORK

Table 51: Result framework of the vegetable value chain

| Indicator | Baseline | Mid-Term | End Target |
|--|----------|-----------|------------|
| Program Development Objective: Enhancing productivity of the vegetable value chain and consumption to support economic growth, poverty reduction, and food security | | | |
| Area cultivated with vegetable by project supported farmers in Ha (Number) | 0 | 1,250 | 2,000 |
| Increase in yield of vegetables for supported farms disaggregated by types (Percentage) | 0 | 15 | 25 |
| Volume of sales of vegetables produced by supported farmers, disaggregated by types (Percentage) | 20 | 50 | 75 |
| Component 1: Increasing production and productivity of vegetables through enhanced access to improved inputs and technology | | | |
| Farmers utilizing improved vegetable planting materials and tools and agrochemicals, disaggregated by gender (number) | 0 | 6,000 | 10,000 |
| Farmers utilizing agriculture machinery and labor-saving technologies, disaggregated by gender (Number) | 0 | 6,000 | 10,000 |
| Farmers adopting improved agronomic practices and CSA technologies, disaggregated by gender (Number) | 0 | 6,000 | 10,000 |
| Farmers accessing AEAS (Number) | 0 | 6,000 | 10,000 |
| | | | |
| Component 2: Improving investment and financing | | | |
| Value chain actors accessing financing, disaggregated by gender (Number) | 0 | 1,000 | 2,000 |
| Cost of investments into the vegetable value chain, disaggregated by value chain activity (Number) | 0 | 6,000,000 | 10,000,000 |
| Value chain actors' capacity strengthened in financial literacy and management, disaggregated by gender and VC activity (Number) | 0 | 3,000 | 5,000 |
| Value chain actors adopting improved financial management systems, disaggregated by gender and VC activity (Number) | 0 | 3,000 | 5,000 |
| Public-private dialogue events held (Number) | 0 | 10 | 20 |
| Participants at public-private events, disaggregated by gender (Number) | 0 | 500 | 1,000 |
| Component 3: Improving value addition and marketing | | | |

| | | | |
|---|---|-------|--------|
| Value addition and processing facilities developed, disaggregated by category (Number) | 0 | 5 | 10 |
| SMEs adding value to vegetables disaggregated by vegetable derivatives (Number) | 0 | 500 | 1,000 |
| Market infrastructure improved with proper handling and storage facilities (Number) | 0 | 5 | 10 |
| Markets adopting standard units of measurement | 0 | 1,000 | 2,000 |
| Entrepreneurship skills training events held, disaggregated by category (Number) | 0 | 50 | 100 |
| Value chain actors accessing market information, disaggregated by gender and VC activity (Number) | 0 | 6,000 | 10,000 |
| Value chain actors accessing new markets, disaggregated by category (Number) | 0 | 50 | 100 |
| Volume of sales of vegetables derivatives by supported SMEs, disaggregated by types (Percentage) | 0 | 25 | 50 |

CHAPTER TWO: CASH CROP VALUE CHAIN PROGRAMS

XXII. CASH CROP VALUE CHAIN

22.1. CONTEXT

Liberia's economy heavily relies on agriculture, which accounts for a significant portion of the GDP, contributing approximately 28.6% as of 2023 (1). This sector is crucial for livelihoods, with around 60% of the population depending on it. Cash crops such as cocoa, coffee, cashew and coconut production are some of its notable sub-sectors showing potential for development, growth, employment and revenue generation. For instance, cocoa has about 40,000 smallholders with a decline in bean production from 4,009 to 3,973 metric tons in 2023 (2). However, challenges persist across the entire cash crops of low yields due to technical and financial constraints among smallholder farmers. Despite these challenges, the projected growth rate of the Liberian economy for 2024 is 5.3%, underscoring the importance of the agricultural sector. However, demographic trends, including population growth (5.3 million), present employment challenges, particularly for young people and women, and are exacerbating existing issues within the labor market (3).

Various institutional players are involved in Liberia's cash crops (cocoa, coffee, cashew and coconut) value chain, including the Central Agricultural Research Institute (CARI), Liberia Agriculture Commodity Regulatory Authority (LACRA), cooperative Development Authorities (CDA), private sectors and the Ministry of Agriculture (MOA). International partners, such as the International Fund for Agricultural Development (IFAD), the World Bank and the International Trade Organization (ITC), also play noticeable and significant roles. These institutions contribute to value chain structuring and financing; however, weaknesses still exist, including inadequate infrastructure, limited access to credit, lack of improved planting materials(research), inadequate technical capacity, lack of research, improper postharvest activities, gender and youth involvement, marketing, poor sector coordination, limited public and private partnership and insufficient extension services. Strengthening these institutions and fostering collaboration among them is essential for overcoming these challenges and promoting sustainable and profitable cash crop value chains.

The Liberian government has demonstrated political will to prioritize agriculture as a key driver of economic transformation. This is evident in its agenda, which emphasizes enhancing agricultural productivity and promoting food sovereignty. However, translating political will into tangible outcomes requires targeted investments and policy interventions in the cash crops sector. Public-private partnerships are crucial for addressing production constraints, improving market access, and fostering innovation in the sector. Government initiatives, such as investment in infrastructure development, extension services, and research and development, are critical for realizing the full potential of the sector value chains thus resulting in the improvement of the livelihoods of smallholder farmers.

22.2. JUSTIFICATION OF THE CASH CROPS VALUE CHAIN PROGRAM

Over the past five years, Liberia's cash crops especially cocoa and coffee sectors have shown variable production and productivity trends. Despite boasting fertile land conducive to cocoa

production, the sector has faced challenges in realizing its full potential. Cocoa production, which stood at 22,000 metric tons in 2021, experienced a slight decline to 20,000 metric tons in 2022 (4). This decline may be attributed to various factors, including weather fluctuations, pest and disease outbreaks, and socio-economic issues affecting smallholder farmers.

Productivity remains a concern within the cocoa sector, with average yields ranging from 200-300 kg/ha, significantly below optimal levels likewise coffee, cashew and coconut. Factors contributing to this include outdated farming practices, limited access to quality inputs such as fertilizers and improved seeds, and inadequate knowledge transfer and extension services. Similarly, the coffee sector has witnessed a decline in production, with many farms abandoned due to market inefficiencies, limited access to resources, and a lack of investment in rejuvenation efforts.

Despite these challenges, recent price upturns and increased participation in cocoa and coffee farming offer renewed hope for the sectors. However, sustainable growth and resilience necessitate a holistic approach that addresses productivity constraints, improves market access and efficiency, and fosters modernization across the entire value chain.

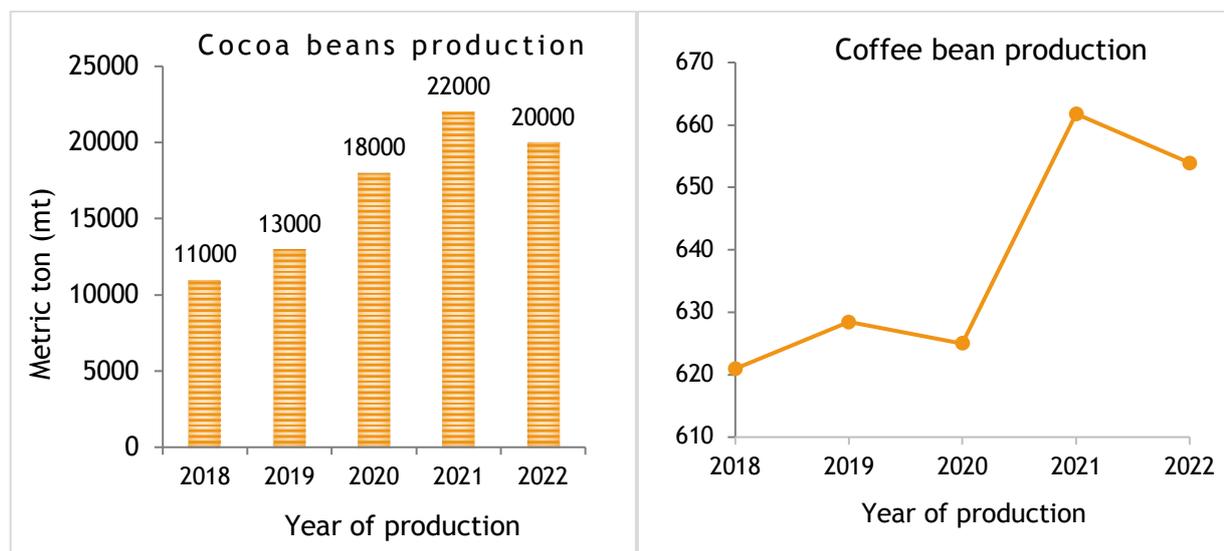


Figure 2: Cocoa and coffee production of the last five years⁶

⁶ <https://www.fao.org/faostat/en/#data/QCL>

22.3. KEY ISSUES FACING THE CASH CROP VALUE CHAIN

Throughout the value chain, from seed systems to marketing production, several key challenges persist. Inadequate seed quality and availability hinder farmers' ability to achieve optimal yields and quality. Many smallholder farmers rely on outdated or uncertified seeds, which may be less productive and prone to diseases. Additionally, limited access to inputs such as fertilizers, pesticides, lack of research and agricultural machinery further constrain productivity.

Poor transportation infrastructure exacerbates these challenges by increasing the cost and difficulty of accessing markets and essential inputs. Farmers often face difficulties transporting their produce to markets, leading to post-harvest losses and reduced profitability. Inefficient market mechanisms, characterized by middlemen and a lack of price transparency, also contribute to farmers receiving lower prices for their produce.

Moreover, the ageing of cocoa and coffee trees poses a significant threat to productivity and quality. Many farms have old, unproductive trees that require rejuvenation efforts through replanting and rehabilitation. However, limited access to financing and technical support hinders farmers' ability to undertake these necessary interventions.

Addressing these key issues requires interventions at multiple levels, including policy reforms to improve market efficiency, investment in infrastructure to enhance transportation networks, and targeted support programs to promote sustainable farming practices and facilitate access to inputs and credit.

22.4. CASH CROPS VALUE CHAIN OPPORTUNITIES

Investing in Liberia's agricultural value chain presents numerous opportunities for economic development, food security, poverty reduction, and environmental sustainability. By modernizing farming techniques and improving access to inputs and credit, Liberia can increase agricultural productivity and reduce its reliance on food imports. This not only enhances food security but also creates employment opportunities for rural youth and smallholder farmers, contributing to poverty reduction and economic diversification.

Furthermore, strengthening value chains can stimulate agro-industrial development, promoting value addition and export diversification. By investing in processing infrastructure and quality control measures, Liberia can produce higher-value agricultural products for both domestic and international markets, thereby increasing export earnings and contributing to GDP growth.

Promoting sustainable agriculture practices, such as agroforestry and integrated pest management, ensures the long-term viability of Liberia's agricultural sector while preserving the environment. By investing in research and extension services, Liberia can develop innovative solutions to address climate change challenges and enhance the resilience of smallholder farmers to environmental shocks.

Overall, investing in Liberia's agricultural value chain offers a pathway to inclusive and sustainable economic growth, providing opportunities for smallholder farmers to improve their livelihoods and contribute to the country's development agenda.

22.5. THE THEORY OF CHANGE OF THE CASH CROPS VALUE CHAIN

Table 52: Agricultural Transformation Framework: Strategies, Expected Outcomes, and Stakeholders

| Main issues | Transformation or change to achieve | Expected results | Main agents of transformation or change | Driving assumptions | Impacts and Links with Government Global Policies |
|---|--|--|---|--|---|
| Access to certified seed and planting material | Support national cocoa seed garden development. Support coffee mother gardens for producing planting materials. | 25,000 ha cocoa landscape cultivated 15,000ha of coffee landscape cultivated 10,000ha cashew landscape cultivated 5 cocoa seed gardens established 5000 farmers trained in | Ministry of Agriculture (MoA), CARI, Private Sector | Promote replanting, new planting and rehabilitation of farms | Create employment Revenue generation |
| Promote sustainable farming practices | Adopt of agroforestry systems. | Environmentally friendly and resilient to climate change | MoA, CARI, International Partners, Private Sector | Protecting the environment while cultivating sustainably | -Climate change mitigation Reduce poverty |
| Increase investment in infrasture and processing facilities | Pave farm-to-market roads Storage facilities, processing plants | Efficient and competitive on the global market | MoA, Ministry of Public Works | Quality of beans produce | Revenue generation |

| | | | | | |
|---|---|---|--------------------------------------|---|--|
| | -irrigation | | | | |
| Strengthen Extension services in cocoa and coffee | Extension services for cocoa and coffee active | 60% extension officers in agricultural districts by 2028. | MoA, Private Sector | Result to sustainable cocoa and coffee production | Poverty reduction |
| Promote Value addition for cocoa and coffee | Domestic value addition of cocoa and coffee. | Local chocolate and coffee on the market. | MoA, partners | Revenue generation | Job creation, particularly for women. |
| Increase Gender mainstreaming | Strengthen social fairness and inclusion | Increase in women participation in cocoa farming | MoA, CDA, International Partners | Women empowerment | Job creation, poverty reduction |
| Youth in Agriculture (cash crops farming) | loan to youth for farming business | Increase in youth participation | MoA, CDA, Partners | Youth empowerment Youth employment | Job creation Poverty reduction |
| Increasing private sector participation | Strengthen the private sector | Increase employment in the private sector | MoA, MoC, international partner, MoF | Tackling and employment and job creation | Poverty reduction |
| Increase Farm certification | cultivation practices meet sustainable standards. | Increase in the price | MoA, International Partners | certification programs lead to high pricing for bean. | Tackle child labor practices and deforestation |

| | | | | | |
|--|---|-------------------------------|----------------------------------|---|-------------------|
| Improve market linkages for cocoa and coffee producers | Connecting farmers to buyers Access new market | Fair price Increase income | LACRA, MoA, Cooperatives, Buyers | Reducing poverty and social-economic livelihood improvement | poverty reduction |
|--|---|-------------------------------|----------------------------------|---|-------------------|

22.5.1. Access to certified seed and planting material

The table suggests supporting the development of national seed gardens for cocoa, cashew, coconut and coffee mother gardens to provide hybrid cocoa seeds to smallholders for rehabilitation, replanting and new planting of farms. This initiative aims to increase productivity and quality within the tree crops sectors. The Ministry of Agriculture (MoA) and the Central Agriculture Research Institute (CARI), Universities and private sector entities are identified as key agents driving this transformation. The driving assumptions include political will for agricultural development, the commitment of technical and financial partners, and the involvement of young people and women. The expected results include increased employment, poverty reduction, and raised domestic economic activities. This transformation aligns with government global policies focused on agricultural development and poverty reduction.

22.5.2. Promote sustainable farming practices

The proposed transformations include adapting agroforestry systems, supporting conservation and irrigation systems, and promoting alternative livelihoods. These actions aim to promote biodiversity, reduce deforestation, and provide diversified income for smallholders. The main agents driving this change are the Ministry of Agriculture, CARI, international partners, and the private sector. The driving assumptions include political will for environmental sustainability, commitment to poverty alleviation, and stakeholder participation in sustainable practices. The expected results include sustainable cocoa, cashew, coconut and coffee production, biodiversity conservation, and protection of natural forests. This aligns with government policies focused on environmental sustainability and poverty alleviation.

22.5.3. Increase investment in infrastructure and process facilities

The transformation involves paving farm-to-market roads, especially in cocoa and coffee belts, to ensure timely purchase of cocoa and coffee beans by buyers. And upgrading storage facilities or process facilities to produce high-quality beans. The Ministry of Agriculture, LACRA and the Ministry of Public Works are identified as the main agents driving this change. The driving assumptions include enhanced agricultural productivity through infrastructure investment. The expected result is making the sector more efficient and competitive on global. This aligns with government policies aimed at infrastructure development and agricultural productivity enhancement.

22.5.4. Strengthen Extension services

The transformation involves providing cultivation and marketing knowledge to farmers through extension services. The main agents driving this change are the Ministry of Agriculture and the private sector. The driving assumptions include investment in agricultural education and training, participation of private entities in extension services, and government support for agricultural extension programs. The expected results include a sustainable agricultural sector. This aligns with government policies focused on agricultural education and extension services.

22.5.5. Promote value addition

The proposed transformation aims to promote domestic value addition of cocoa and coffee, leading to the production of locally processed products like chocolate, coconut oil, coconut milk and coffee

for domestic consumption. The main agents driving this change are the private sector and international partners. The driving assumptions include access to processing facilities and technology, commitment to value-addition initiatives, and involvement of stakeholders in value chain development. The expected results include job creation, particularly for women. This aligns with government policies focused on industrialization and job creation.

22.5.6. Increase Gender mainstreaming

The transformation aims to promote social fairness and inclusion in the cash crops sector to boost income and yields among women. The main agents driving this change are the Ministry of Agriculture, the Community Development Agency (CDA), and international partners. The driving assumptions include gender equality policies and programs, participation of women in agricultural activities, and commitment to inclusive development. The expected results include job creation and poverty reduction. This aligns with government policies focused on gender equality and poverty reduction.

22.5.7. Youth in Agriculture cash crop farming

The proposed transformation aims to encourage youth participation in cocoa farming to boost domestic economic activities. The main agents driving this change are the Ministry of Agriculture, CDA, and partners. The driving assumptions include opportunities for youth engagement in agriculture, production of goods and services such as organic fertilizers, and bio-pesticides, production of cash crops seedlings as business enterprises, support for youth-led agricultural initiatives, and commitment to youth empowerment. The expected results include a boost in domestic economic activities and employment. This aligns with government policies focused on youth employment and economic development.

22.5.8. Increasing private sector participation

The transformation aims to strengthen public-private partnerships in the cocoa, cashew, coconut and coffee sectors to enhance service provision. The main agents driving this change are the Ministry of Agriculture and the private sector. The driving assumptions include government policies promoting private sector involvement, commitment to fostering partnerships, and participation of private entities in agricultural development. The expected results include job creation and revenue generation. This aligns with government policies focused on private-sector development and economic growth.

22.5.9. Increase farm certification

The proposed transformation aims to ensure that cultivation practices meet sustainable standards by certifying cocoa and coffee cooperatives. The main agents driving this change are the Ministry of Agriculture and international partners. The driving assumptions include the availability of resources for certification processes, commitment to sustainable farming practices, and access to certification programs. The expected results include better pricing for smallholders and improved livelihoods. This aligns with government policies focused on sustainable agriculture and smallholder empowerment.

22.5.10. Improve market linkages for cash crop producers

The transformation aims to strengthen an active and inclusive farm gate pricing committee to ensure transparency and fairness in pricing mechanisms for cocoa and coffee farmers. To connect producers and buyers and seek new market for farmers. The main agents driving this change are the Liberia Agriculture Commodity Regulatory Authority (LACRA), the Ministry of Agriculture, cooperatives, and buyers. The driving assumptions include transparency in pricing mechanisms, participation of stakeholders in pricing decisions, and government support for fair pricing regulations. The expected result is a high and stable price leading to socioeconomic livelihoods improvement of smallholders. This aligns with government policies focused on agricultural market regulation and smallholder empowerment.

22.6. DEVELOPMENT OBJECTIVE OF THE COCOA VALUE CHAIN

The developmental objective of the cash crop value chain is:

- To create a modern, resilient, and competitive cash crops industry where all parties involved work towards a sustainable cocoa, cashew, coconut and coffee economy, benefiting farmers, the environment and their communities.

Specific Objectives

- Farm-level productivity enhancement: To raise the productivity of farms by promoting sound agricultural practices for the production of cash crops and by making better planting materials more widely available and reasonably priced.
- Sustainable cash crops sector: To encourage farmers to implement sustainable agricultural practices, such as integrated pest management, effective irrigation, and soil conservation strategies in the face of climate change, including agroforestry.
- Facilitate the establishment of effective market linkages between producers, processors, wholesalers, and retailers to ensure efficient value chain coordination and market access for agricultural products.
- Research and capacity building: To increase the skills and knowledge of farmers, researchers, extension agents, and other stakeholders in the areas of post-harvest handling, business management, and cocoa, cashew, coconut and coffee research and production.
- Value addition: To promote value-added products and agro-processing activities to increase the profitability and competitiveness of agricultural enterprises along the value chain.
- Gender & youth: To increase the participation of women and youth in cash crop farming to improve their social-economic livelihood.

XXIII. COCOA VALUE CHAIN

23.1. COMPONENTS

23.1.1. Component 1: Cocoa Farm level productivity enhancement and new planting

The farm-level productivity enhancement component of the program encompasses several interventions aimed at improving cocoa yield and new planting. Firstly, the National Cocoa Seed Garden Development, led by the Ministry of Agriculture (MoA) and the Central Agricultural Research Institution (CARI), focuses on expanding high-yield cocoa hybrid seed production across Liberia, starting from Beeplay in Nimba County and extending to other regions.

Concurrently, capacity development initiatives for cocoa researchers, primarily conducted by CARI in Suakoko District, Bong County, will train researchers in cocoa and coffee agronomy, breeding, and plant protection over the 5 years of the program. The aim is to strengthen research and makes the sector sustainable and meeting the objective of the program.

Furthermore, new planting initiative, spearheaded by MoA, CARI, and international partners, will seek to rehabilitate old farms and establish new cocoa landscapes in cocoa growing region in Liberia. Each intervention's implementation timeline is structured, with cocoa seed garden and new farm establishment starting in the first year, while capacity development and broader support to existing farm management efforts span the subsequent years of the program.

23.1.1.1. Sustainable cocoa farming

The strategy for enhancing the sustainability of Liberia's cocoa involves a multi-faceted approach encompassing technical interventions and capacity-building initiatives. Technical interventions are aimed at improving cultivation practices, soil fertility management, agroforestry promotion, irrigation systems, and integrated pest and disease management. These efforts will be led by a collaborative effort between the Ministry of Agriculture (MoA), the Cocoa Research Institute of Liberia (CARI), the Liberia Agriculture Commodity Regulatory Authority (LACRA), cocoa cooperatives, international partners, and the private sector.

Implementation of these technical interventions will span across cocoa growing counties nationwide, addressing the diverse needs of farmers and agricultural landscapes. They will be integrated into the broader program timeline, ensuring synchronized efforts and maximum impact. Concurrently, capacity-building interventions will target specific communities, focusing on post-harvesting activities, youth engagement in cocoa farming, and gender mainstreaming in the value chain.

Post-harvesting activities, including quality bean production, fermentation techniques, and facility construction, will be facilitated by MoA, LACRA, and the private sector. This initiative aims to enhance the quality and marketability of cocoa beans, thereby improving the livelihoods of farmers and processors alike. Youth engagement in cocoa farming will be promoted through tailored

incentives, technical support, and business training, fostering a new generation of cocoa entrepreneurs.

Moreover, gender mainstreaming efforts within the cocoa value chain will be coordinated by MoA and key stakeholders, ensuring equitable access to resources and opportunities for female farmers. These initiatives will involve sensitization programs, capacity-building workshops, and institutional reforms to promote gender equality and social inclusion.

Each intervention is accompanied by a detailed plan outlining beneficiary involvement and cost considerations. By leveraging the expertise and resources of multiple stakeholders, it aims to create a more resilient and sustainable cocoa and coffee sector in Liberia, benefiting farmers, communities, and the economy at large.

23.1.1.2. Research and capacity building

Research and capacity building are fundamental pillars for enhancing productivity and sustainability within the agricultural sector, particularly in cocoa production. For this reason, the national cocoa seed garden in Beeplay will be transformed into a sub-research station under CARI for precisely cocoa search to meet the demand and need for smallholders in the sector. MoA, CARI and its partners will lead the transformation and establishment of the sub-research station for cocoa development and sustainability in the country. The need capacity to carry on actionable research will be developed by MoA and CARI to adequately serve the 5 seed gardens that will be established in regions in Liberia for planting materials source.

23.1.1.3. Capacity building for researchers

Effective research forms the backbone of agricultural advancements especially for cocoa sector sustainability. To support this, capacity building initiatives is proposed targeting researchers in cocoa and universities. These initiatives will focus on key areas including agronomy, plant protection, soil science, agroforestry, and post-harvest practices. The implementation will involve collaboration with institutions such as CARI (Cocoa and Coffee Research Institute), LACRA (Coffee and Cocoa Regulatory Authority), university of Liberia, Cuttington University and MoA (Ministry of Agriculture) over the period of 2024-2028. Specialized training programs will cater to developing researcher's capacities as master and PhD levels.

23.1.1.4. Laboratory support

Rehabilitating and equipping agronomic laboratories are crucial for ensuring the sustainability of cocoa value chains. Additionally, specialized training programs for laboratory technicians will be conducted to enhance their skills in cocoa and coffee research. This initiative, led by CARI, will span from 2024 to 2026, with 6 technicians undergoing training for 6-8 months between 2024-2025.

23.1.1.5. Post-harvest and agribusiness training

Building expertise in post-harvest practices and agribusiness is vital for optimizing cocoa and coffee value chains. Training programs will be designed to equip professionals with the necessary skills in post-harvest management and agribusiness development. LACRA will spearhead this effort, offering 3-4 specialties for Master's programs from 2024 to 2028.

23.1.1.6. Extension services and agronomy training

Enhancing extension services and agronomy knowledge among stakeholders is essential for disseminating best practices and improving agricultural productivity. Capacity building programs will focus on extension services and agronomy to empower professionals working directly with farmers. The Ministry of Agriculture (MoA) will oversee this initiative, offering 4-6 specialties for Master's programs from 2024 to 2028.

23.1.1.7. Market research and data collection

Regular market research and data collection activities are crucial for informed decision-making within the cocoa sector. These initiatives will provide insights into market trends, production dynamics, and the socioeconomic status of smallholder farmers. Implemented by CARI, LACRA, and private sector partners, these activities will be ongoing throughout the program duration.

23.1.2. Component 2: Post harvest and value addition

Strengthening the capacity of farmers via training on post-harvesting activities in cocoa cultivation will drive the farmers to achieve quality cocoa bean resulting to higher price per/kg. The use of solar dryer should be promoted and encouraged by stallholders in the sector thus leading to the farmers producing more grade 1 cocoa bean as compared to grade 2.

Promotion of local manufacturing of cocoa beans into chocolate and promote local consumption as well as coffee local value addition like manufacturing of fine coffee. Support to private sector intervention should be encourage for local manufacturing. Access to finance should be timely intervention for sustainable value addition.

The implementer for this intervention should be led by the private sector and the ministry of Agriculture. Smallholder should be trained on how to add value on cocoa husk apart from the bean in making different economically useful materials. The training should further extend to cocoa bean and coffee local processing and manufacturing.

Priority will be given to companies involving in processing of primary and tertiary beans locally and internationally. Access to loan, capacity building and inputs supply will be prioritized as well for companies involved.

23.2.EXPECTED RESULTS

The interventions planned for the cocoa value chain are expected to bolster its strength and sustainability, leading to the following anticipated outcomes:

- 25,000 ha of new cocoa farms established in five cocoa producing counties over five years
- National cocoa gardens established in five cocoa-producing counties to provide improved planting materials for cocoa farmers
- National cocoa research institute established to support cocoa value chain development
- National cocoa board established to provide guidance for development of the value chain

23.3. BUDGET FOR COCOA VALUE CHAIN

The table below outlines a comprehensive strategy for enhancing cocoa production through various priorities and strategies over a five-year period. Priority 1 focuses on expanding cocoa cultivation across 25,000 hectares, with strategies including the establishment of a national cocoa seed garden and promoting good cultivation practices. Priority 2 aims at establishing national cocoa gardens in five cocoa-producing counties, involving activities such as site selection, land preparation, and staff accommodation. Priority 3 involves setting up a national cocoa research institute to support the cocoa value chain, with activities including infrastructure development and staff capacity building. Priority 4 focuses on establishing a national cocoa board to provide guidance for value chain development, involving activities like awareness campaigns and board recruitment. The total cost for these initiatives over the five years amounts to \$31,275,000.

Table 53: Cocoa value chain development plan budget

| Priorities & strategies | cost/ha | land areas (ha)/Y | Year 1-cost | year 2-cost | year 3-cost | year 4 - cost | Year 5-cost | Total |
|---|----------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Priority 1: 25,000 ha cocoa landscape cultivation: increase production | 1000 | 25,000 | \$5,250,000 | \$5,250,000 | \$5,250,000 | \$5,250,000 | \$5,250,000 | \$26,250,000 |
| Activity 1: strengthen the source of the supply of improved planting materials on the county: national cocoa seed garden | 150 | 5000 | \$750,000 | \$750,000 | \$750,000 | \$750,000 | \$750,000 | \$3,750,000 |
| Activity 2: Promoting nursery development (public and private nurseries) | 100 | 5000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 3: Promoting good cultivation practices | 100 | 5000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 4: Encourage farm rehabilitation & new planting | 100 | 5000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 5: controlling pest and disease | 100 | 5000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 6: Strengthening soil health and good Agricultural practices | 100 | 5000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 7: Encouraging planting. Timber and fruit trees intercropping in cocoa farms | 100 | 5000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 8: Promoting cocoa agroforestry system | 100 | 5000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 9: Strengthen gender mainstreaming and youth participation in cocoa farming | 100 | 5000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 10: cocoa extension services | 100 | 5000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Priority 2: National cocoa gardens established in five cocoa-producing counties to provide improved planting materials for cocoa farmers | 238,000 | 24 | \$714,000 | \$714,000 | \$714,000 | \$714,000 | \$714,000 | \$3,570,000 |
| Activity 1: site selection | 8,000 | 3 | \$24,000 | \$24,000 | \$24,000 | \$24,000 | \$24,000 | \$120,000 |
| Activity 2: land preparation | 10,000 | 3 | \$30,000 | \$30,000 | \$30,000 | \$30,000 | \$30,000 | \$150,000 |

| | | | | | | | | |
|--|----------|----------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Activity 3: multiplication of parental materials | 10,000 | 3 | \$30,000 | \$30,000 | \$30,000 | \$30,000 | \$30,000 | \$150,000 |
| Activity 4: field layout | 10,000 | 3 | \$30,000 | \$30,000 | \$30,000 | \$30,000 | \$30,000 | \$150,000 |
| Activity 5 : office and staff accommodation | 50,000 | 3 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |
| Activity 6: Breeding work to produce hybrid seed and logistics | 50,000 | 3 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |
| Activity 7: Capacity building | 50,000 | 3 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |
| Activity 8: Research work and seed supply | 50,000 | 3 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |
| Priority 3: National cocoa research institute established to support cocoa value chain development | 0 | 0 | \$815,000 | \$0 | \$0 | \$0 | \$0 | \$815,000 |
| Activity 1: Infrastructure | 0 | 0 | \$300,000 | \$0 | \$0 | \$0 | \$0 | \$300,000 |
| Activity 2: Laboratory | 0 | 0 | \$300,000 | \$0 | \$0 | \$0 | \$0 | \$300,000 |
| Activity 3: staff capacity | 0 | 0 | \$15,000 | \$0 | \$0 | \$0 | \$0 | \$15,000 |
| Activity : logistic and Input | 0 | 0 | \$200,000 | \$0 | \$0 | \$0 | \$0 | \$200,000 |
| Priority 4: National cocoa board established to provide guidance for development of the value chain | | | \$640,000 | \$0 | \$0 | \$0 | \$0 | \$640,000 |
| Activity 1: Awareness and meeting | 0 | 0 | \$50,000 | \$0 | \$0 | \$0 | \$0 | \$50,000 |
| Activity 2: recruitment of board member | 0 | 0 | \$300,000 | \$0 | \$0 | \$0 | \$0 | \$300,000 |
| Activity 3: office and operation of the board | 0 | 0 | \$290,000 | \$0 | \$0 | \$0 | \$0 | \$290,000 |
| Grand Total | | | \$7,419,000 | \$5,964,000 | \$5,964,000 | \$5,964,000 | \$5,964,000 | \$31,275,000 |

XXIV. COFFEE VALUE CHAIN PROGRAM

24.1. COMPONENTS

24.1.1. Component 1: Coffee Farm level productivity enhancement

For the sector to attract international investment, and contribute to the country's progress. The program's farm-level productivity enhancement component includes a variety of interventions aimed at increasing coffee yield and encouraging additional planting of 15,000 ha. This will entail the establishment of a sub-research station for coffee under CARI. Moreover, the need to establish coffee mother gardens in growing regions in the country. This will make access to improved planting materials easier and timely for field planting. The gain made by ITC, MoA and CARI in coffee sector revitalization will be essential in achieving the timely target of the coffee landscape cultivation in the next 5 years.

24.1.1.1. Sustainable, research and capacity development

Providing coffee farmers with training and technical assistance on best techniques for planting, harvesting, and post-harvest processing will help to increase crop yields and quality. This component could also include teaching on sustainable farming practices, pest and disease management, and climate-smart agriculture approaches. The establishment of coffee sub-research station will greatly drive the sustainability and training aspect of the value chain.

24.1.1.2. Market access and value addition

Creating market linkages for coffee growers and cooperatives can help them connect with buyers both locally and internationally. Furthermore, supporting value-added operations such as coffee roasting, packaging, and branding can assist raise the value of Liberian coffee products and provide new market prospects.

24.1.1.3. Infrastructure development

Investing in infrastructure such as coffee processing facilities, storage warehouses, and transportation networks is critical to increasing the efficiency of the coffee value chain. Upgrades to infrastructure can assist reduce post-harvest losses, improve quality control, and increase market access for coffee farmers.

24.1.1.4. Policy and regulatory support

Advocating for coffee-friendly policies and regulations, such as land tenure reform, increased access to finance, and enforcement of quality standards, can help to establish a favorable climate for coffee value chain development. It is critical to work with government agencies, industry stakeholders, and international partners to eliminate policy impediments and foster a favorable business environment for coffee farmers.

24.2. EXPECTED RESULT

- Revive the coffee subsector and develop appropriate programs to sustain activities in the sector
- 15,000 ha of new smallholder coffee farms developed over five years through tailored program
- National coffee research institute established to support coffee value chain development

24.3. BUDGET OF THE VALUE CHAIN PROGRAM FOR COFFEE

The table below outlines a five-year plan with cost estimates for various priorities and strategies aimed at enhancing the coffee production. Priority 1 focuses on expanding coffee cultivation, with strategies like improving planting materials, nursery development, and pest control, among others, totaling \$15.75 million. Priority 2 aims to revive the coffee subsector through activities like value chain development and marketing, costing \$13.5 million. Priority 3 involves establishing a national coffee research institute with infrastructure, laboratory, and training programs, amounting to \$3.025 million. In total, the plan requires \$32.275 million over five years to implement.

Table 54: Coffee value chain program budget

| Priorities & strategies | cost/ha | land areas (ha)/Y | Year 1-cost | year 2-cost | year 3-cost | year 4 -cost | Year 5-cost | Total |
|--|----------------|--------------------------|--------------------|--------------------|--------------------|---------------------|--------------------|---------------------|
| Priority 1: 15,000 ha coffee landscape cultivation: increase production | 1000 | 15,000 | \$3,150,000 | \$3,150,000 | \$3,150,000 | \$3,150,000 | \$3,150,000 | \$15,750,000 |
| Activity 1: strengthen the source of the supply of improved planting materials on the county: national cocoa seed garden | 150 | 3000 | \$450,000 | \$450,000 | \$450,000 | \$450,000 | \$450,000 | \$2,250,000 |
| Activity 2: Promoting nursery development (public and private nurseries) | 100 | 3000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 3: Promoting good cultivation practices | 100 | 3000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 4: Encourage farm rehabilitation & new planting | 100 | 3000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 5: controlling pest and disease | 100 | 3000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 6: Strengthening soil health and good Agricultural practices | 100 | 3000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 7: Encouraging planting. Timber and fruit trees intercropping in cocoa farms | 100 | 3000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 8: Promoting cocoa agroforestry system | 100 | 3000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 9: Strengthen gender mainstreaming and youth participation in cocoa farming | 100 | 3000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 10: cocoa extension services | 100 | 3000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Priority 2: Revive the coffee subsector and develop appropriate programs to sustain activities in the sector | 0 | | \$2,700,000 | \$2,700,000 | \$2,700,000 | \$2,700,000 | \$2,700,000 | \$13,500,000 |
| Activity 1: coffee mother garden development program | 0 | 1 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$1,250,000 |
| Activity 2: value chain program | 0 | 1 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$5,000,000 |
| Activity 3: post-harvest handling program | 0 | 1 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 4: processing of bean program | 0 | 1 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$1,250,000 |
| Activity 5 : gender and youth mainstreaming program | 0 | 1 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$1,250,000 |
| Activity 6: marketing and pricing program | 0 | 1 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$500,000 |
| Activity 7: public and private sector engagement program | 0 | 1 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |
| Activity 8: strengthening coffee cooperatives program | 0 | 1 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |

| | | | | | | | | |
|--|----------|----------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Priority 3: National coffee research institute established to support cocoa value chain development | 0 | 0 | \$3,025,000 | \$0 | \$0 | \$0 | \$0 | \$3,025,000 |
| Activity 1: Infrastructure | 0 | 0 | \$1,000,000 | \$0 | \$0 | \$0 | \$0 | \$1,000,000 |
| Activity 2: Laboratory | 0 | 0 | \$625,000 | \$0 | \$0 | \$0 | \$0 | \$625,000 |
| Activity 3: staff capacity and training of farmers | 0 | 0 | \$400,000 | \$0 | \$0 | \$0 | \$0 | \$400,000 |
| Activity 4 : logistics, Input & research activities | 0 | 0 | \$1,000,000 | \$0 | \$0 | \$0 | \$0 | \$1,000,000 |
| Grand Total | | | \$8,875,000 | \$5,850,000 | \$5,850,000 | \$5,850,000 | \$5,850,000 | \$32,275,000 |

XXV. COCONUT VALUE CHAIN PROGRAM

25.1. COMPONENTS

25.1.1. Component 1: coconut Farm level productivity enhancement

Enhancing coconut farm productivity is critical for increasing yields and enhancing the overall efficiency of Liberia's coconut value chain. Here are some techniques to increase production on farms:

- *Improved farming practices*: Providing coconut farmers with training and technical assistance in cultivation, fertilization, irrigation, and pest and disease management will help boost yields and quality. Encourage the use of sustainable agricultural techniques, such as intercropping, mulching, and organic farming, to improve soil health and production.
- *Access to quality inputs*: Providing farmers with high-quality seeds, seedlings, fertilizers, and insecticides is critical for increasing output. Establishing nurseries to produce high-quality coconut seedlings, as well as giving subsidies or credit schemes to farmers for input purchases, can help boost farm output.
- *Post-harvest handling and processing*: Proper post-harvest techniques, including as timely harvesting, dehusking, and drying, are crucial for preserving coconut quality and minimizing losses. Investing in post-harvest infrastructure, like as drying rooms and storage warehouses, can assist farmers maintain the quality of their crop and increase its shelf life.
- *Technology adoption*: Encouraging farmers to use technology such as drip irrigation systems, mechanized harvesting equipment, and mobile farm management apps can help them improve efficiency and output. Farmers can be empowered to optimize their operations by receiving technology training and having access to innovative solutions.
- *Market linkages and value addition*: Connecting farmers to markets and supporting value-added activities like coconut oil manufacturing, coconut water processing, and coconut-based goods can boost the value of coconut farming. Cooperatives, farmer organizations, and buyer partnerships can help farmers improve their market options and earn higher returns on their produce.

25.1.2. Component 2: Research and capacity building

- Is critical to the success of Liberia's coconut value chain. This can be achieved through tactics such as doing cultivation and processing studies, which is critical for increasing productivity and quality. Research can help with determining the best planting date, disease and pest control, and post-harvest handling and processing technology.
- Investing in research intuitions, such as establishing a sub-coconut research station under the national research station and boosting universities in areas with strong coconut production, can assist produce knowledge, creativity, and technologies for the sector growth in Liberia. Collaboration with international research organizations, industry specialists, and development partners can also help to enhance information sharing and technology transfer in the coconut value chain.

25.2. Expected results

- Support cultivation of 2 million new coconut trees in the Southeastern coastal counties of Rivercess, Sinoe, Grand Kru, and Mary Land
- Private-sector investment facilitated to support local value addition of coconut and coconut by-products

- National coconut research program developed and supported at the Tubman University (TU) to develop innovation in the coconut industry
- Coconut seedling gardens established in four designated counties through private-sector initiative for the production and distribution of improved varieties of coconut seedling

25.3. BUDGET OF THE VALUE CHAIN PROGRAM FOR COCONUT

The table below outlines a strategic plan for the development of the coconut industry, focusing on priorities, strategies, and associated costs over a five-year period. Priority 1 involves supporting the cultivation of 2 million new coconut trees in specific coastal counties, with strategies including strengthening planting materials supply, promoting nursery development, and encouraging good cultivation practices. Priority 2 aims at facilitating private-sector investment to enhance local value addition of coconut products through activities such as supporting value addition businesses and providing access to loans. Priority 3 emphasizes the development of a national coconut research program at Tubman University, focusing on capacity development, infrastructure upgrade, and research facilitation. Priority 4 focuses on establishing coconut seedling gardens through private-sector initiatives, including promoting private nursery establishment and providing technical and financial support. The total cost for implementing these priorities and strategies over five years amounts to \$30,250,700.

Table 55: Coconut value chain development budget

| Priorities & strategies | cost/ha | ha | Year 1- cost | year 2- cost | year 3- cost | year 4 - cost | Year 5-cost | Total |
|--|-------------|--------------|------------------|------------------|------------------|------------------|------------------|--------------------|
| Priority 1: Support cultivation of 2 million new coconut trees in the South-eastern coastal counties of Reverses, Sinoe, Grand Kru, and Mary Land | 1000 | 1,333 | \$279,300 | \$279,300 | \$279,300 | \$279,300 | \$279,300 | \$1,396,500 |
| Activity 1: strengthen the source of the supply of improved planting materials on the county: national cocoa seed garden | 150 | 266 | \$39,900 | \$39,900 | \$39,900 | \$39,900 | \$39,900 | \$199,500 |
| Activity 2: Promoting nursery development (public and private nurseries) | 100 | 266 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$133,000 |
| Activity 3: Promoting good cultivation practices | 100 | 266 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$133,000 |
| Activity 4: Encourage farm rehabilitation & new planting | 100 | 266 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$133,000 |
| Activity 5: controlling pest and disease | 100 | 266 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$133,000 |
| Activity 6: Strengthening soil health and good Agricultural practices | 100 | 266 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$133,000 |
| Activity 7: Encouraging planting. Timber and fruit trees intercropping in coconut farms | 100 | 266 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$133,000 |
| Activity 8: Promoting agroforestry system | 100 | 266 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$133,000 |

| | | | | | | | | |
|---|------------|------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Activity 9: Strengthen gender mainstreaming and youth participation in coconut farming | 100 | 266 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$133,000 |
| Activity 10: coconut extension services | 100 | 266 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$26,600 | \$133,000 |
| Priority 2: Private-sector investment facilitated to support local value addition of coconut and coconut by-products | 0.0 | 0.1 | \$2,947,660 | \$2,947,660 | \$2,947,660 | \$2,947,660 | \$2,947,660 | \$14,738,300 |
| Activity 1: Support to private sector for value addition | 0.0 | 1.0 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 2: Support to Agribusiness engaged in value addition and input supply | 0.0 | 1.0 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$5,000,000 |
| Activity 3: access to loan to strengthen value addition | 0.0 | 1.0 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 4: promoting post-harvest and processing | 0.0 | 1.0 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 5 : support to market information gathering and | 0.0 | 1.0 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |
| Activity 6: Basic agronomic training | 0.0 | 1.0 | \$147,660 | \$147,660 | \$147,660 | \$147,660 | \$147,660 | \$738,300 |
| Activity 7: Logistics | 0.0 | 1.0 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |
| Priority 3: National coconut research program developed and supported at the Tubman University (TU) to develop innovation in the coconut industry | 0.0 | 1.0 | \$2,317,272 | \$2,317,272 | \$2,317,272 | \$2,317,272 | \$2,317,272 | \$11,586,360 |
| Activity 1: Strengthen TU university for coconut research by capacity development | 0.0 | 1.0 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 2: Upgrade infrastructure for coconut research | 0.0 | 1.0 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$5,000,000 |
| Activity 3: support post-harvest and processing research facilitate at the university | 0.0 | 1.0 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 4: linking the university to potential coconut farmers in the region | 0.0 | 1.0 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity: providing research and scholarship grant | 0.0 | 1.0 | \$217,272 | \$217,272 | \$217,272 | \$217,272 | \$217,272 | \$1,086,360 |
| Priority 4: coconut seedling gardens established in four designated counties through private-sector initiative for the production and distribution of improved varieties of coconut seedling | 0.0 | | \$0 | \$0 | \$843,180 | \$843,180 | \$843,180 | \$2,529,540 |

| | | | | | | | | |
|---|-----|-----|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Activity1: capacitating and promoting private nursery establishment | 0.0 | 1.0 | \$0 | \$0 | \$300,000 | \$300,000 | \$300,000 | \$900,000 |
| Activity 2: providing technical knowledge and extension services for private nursery operators | 0.0 | 1.0 | \$0 | \$0 | \$200,000 | \$200,000 | \$200,000 | \$600,000 |
| Activity 3: financial and technical support to private nursery to established permanent gardens for coconut planting source | 0.0 | 1.0 | \$0 | \$0 | \$343,180 | \$343,180 | \$343,180 | \$1,029,540 |
| Grand Total | | | \$5,544,232 | \$5,544,232 | \$6,387,412 | \$6,387,412 | \$6,387,412 | \$30,250,700 |



XXVI. CASHEW VALUE CHAIN PROGRAM

26.1. COMPONENTS

26.1.1. Component 1: Farm-level productivity enhancement

- Improving farm-level productivity is crucial for increasing cashew yields and quality. This component includes providing training and technical assistance to farmers on best practices for cultivation, fertilization, irrigation, pest and disease management, and post-harvest handling. Access to quality inputs, such as seeds, fertilizers, and pesticides, is also important for enhancing productivity.
- *Processing and value addition:* Developing processing facilities for cashew nuts can add value to the raw product and create new market opportunities. This component involves establishing processing plants for shelling, drying, and packaging cashew nuts. Value addition can also include producing cashew kernel products, such as roasted cashews, cashew butter, and cashew milk, to diversify the product range and increase market competitiveness.
- *Market access and market linkages:* Facilitating market access for cashew farmers and cooperatives is crucial for connecting them to buyers and expanding market opportunities. This component involves establishing market linkages with local and international buyers, promoting the quality and uniqueness of Liberian cashew products, and participating in trade fairs and exhibitions to showcase the country's cashew industry.
- *Capacity building and training:* Providing training and capacity building programs for farmers, processors, and other stakeholders in the cashew value chain is essential for enhancing skills, knowledge, and capabilities. Training programs can cover a range of topics, including farming techniques, post-harvest handling, quality control, marketing, business management, and financial literacy.
- *Policy advocacy and enabling environment:* Advocating for supportive policies and regulations for the cashew sector is important for creating an enabling environment for value chain development. This component involves engaging with government agencies, industry stakeholders, and international partners to address policy barriers, promote a favorable business environment, and ensure that the needs of cashew farmers and stakeholders are met.

26.2. EXPECTED RESULTS

- 10,000 ha of greenfield cashew plantation developed through smallholder support program
- 5,000 cashew farmers, of which 60% are youth and women trained in cashew cultivation
- National cashew production and local value addition expanded through support to private-sector initiative
- Cashew research program developed and supported at the Central Agriculture Research Institute (CARI)

- National cashew gardens established in designated cashew production zones to facilitate farmers' access to improved planting material

26.3.BUDGET OF THE VALUE CHAIN PROGRAM FOR CASHEW

The table below outlines a comprehensive budget plan for cashew cultivation and development, spanning various priorities over a five-year period. Priority 1 focuses on establishing a large-scale greenfield cashew plantation through smallholder support programs, with associated costs for activities like improving planting materials, promoting nursery development, and implementing good cultivation practices. Priority 2 emphasizes training and capacity building for cashew farmers, particularly targeting youth and women, through initiatives such as field schools, nursery training, and agronomic education. Priority 3 aims to expand national cashew production and local value addition by supporting private-sector initiatives, including nursery establishment, grants for smallholder processors, and programs promoting women's involvement in cultivation and processing. Priority 4 allocates funds for a cashew research program, covering activities like capacity building, germplasm collections, and training programs. Finally, Priority 5 involves establishing national cashew gardens in designated production zones to facilitate farmers' access to improved planting materials, with associated costs for garden establishment, technical support, and capacity building. Overall, the budget reflects a multi-faceted approach to promote and enhance the cashew industry, addressing key areas from cultivation to research and value addition.

Table 56: Cashew value chain development budget

| Priorities & strategies | cost/h a | land areas (ha)/Y | Year 1- cost | year 2- cost | year 3- cost | year 4 - cost | Year 5- cost | Total |
|--|-------------|-------------------------|-----------------|-----------------|-----------------|------------------|-----------------|--------------|
| Priority 1: 10,000 ha of greenfield cashew plantation developed through smallholder support program | 1000 | 10,000 | \$2,100,000 | \$2,100,000 | \$2,100,000 | \$2,100,000 | \$2,100,000 | \$10,500,000 |
| Activity 1: strengthen the source of the supply of improved planting materials on the county: national cocoa seed garden | 150 | 2000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 2: Promoting nursery development (public and private nurseries) | 100 | 2000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 3: Promoting good cultivation practices | 100 | 2000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 4: Encourage farm rehabilitation & new planting | 100 | 2000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 5: controlling pest and disease | 100 | 2000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 6: Strengthening soil health and good Agricultural practices | 100 | 2000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |

| | | | | | | | | |
|---|-----|------|-----------|-----------|-----------|-----------|-----------|-------------|
| Activity 7: Encouraging planting. Timber and fruit trees intercropping in coconut farms | 100 | 2000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 8: Promoting agroforestry system | 100 | 2000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 9: Strengthen gender mainstreaming and youth participation in coconut farming | 100 | 2000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 10: coconut extension services | 100 | 2000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |

| | | | | | | | | |
|---|------------|------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Priority 2: 5,000 cashew farmers, of which 60% are youth and women trained in cashew cultivation | 0.0 | 0.1 | \$1,005,660 | \$1,005,660 | \$1,005,660 | \$1,005,660 | \$1,005,660 | \$5,028,300 |
|---|------------|------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|

| | | | | | | | | |
|---|-----|-----|-----------|-----------|-----------|-----------|-----------|-------------|
| Activity 1: Farmers Field school for cashew cultivation | 0.0 | 1.0 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$500,000 |
| Activity 2: Nursery training | 0.0 | 1.0 | \$58,000 | \$58,000 | \$58,000 | \$58,000 | \$58,000 | \$290,000 |
| Activity 3: Basic crop protection training | 0.0 | 1.0 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 4: Agroforestry training | 0.0 | 1.0 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 5 : postharvest training | 0.0 | 1.0 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |
| Activity 6: Basic agronomic training | 0.0 | 1.0 | \$147,660 | \$147,660 | \$147,660 | \$147,660 | \$147,660 | \$738,300 |
| Activity 7: Logistics | 0.0 | 1.0 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |

| | | | | | | | | |
|--|------------|------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Priority 3: National cashew production and local value addition expanded through support to private-sector initiative | 0.0 | 1.0 | \$1,500,000 | \$2,000,000 | \$1,500,000 | \$1,500,000 | \$1,500,000 | \$8,000,000 |
|--|------------|------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|

| | | | | | | | | |
|---|-----|-----|-----------|-------------|-----------|-----------|-----------|-------------|
| Activity 1: support to cashew private sector nursery establishment | 0.0 | 1.0 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 2: grant and loan support to smallholder processors | 0.0 | 1.0 | \$500,000 | \$1,000,000 | \$500,000 | \$500,000 | \$500,000 | \$3,000,000 |
| Activity 3: support to program that promote women in cultivation and processing | 0.0 | 1.0 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity 4: support to private actors especially cooperative to work with women farmers | 0.0 | 1.0 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Activity: organize and support public and private partnership | 0.0 | 1.0 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |

| | | | | | | | | |
|---|------------|--|------------|------------|------------------|------------------|------------------|--------------------|
| Priority 4: Cashew research program developed and supported at the Central Agriculture Research Institute (CARI) | 0.0 | | \$0 | \$0 | \$500,000 | \$500,000 | \$500,000 | \$1,500,000 |
|---|------------|--|------------|------------|------------------|------------------|------------------|--------------------|

| | | | | | | | | |
|--|-----|-----|-----|-----|-----------|-----------|-----------|-----------|
| Activity1: support to capacity building: developing capacity for cashew research | 0.0 | 1.0 | \$0 | \$0 | \$200,000 | \$200,000 | \$200,000 | \$600,000 |
|--|-----|-----|-----|-----|-----------|-----------|-----------|-----------|

| | | | | | | | | |
|--|-----|-----|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Activity 2: germplasm collections program for cashew | 0.0 | 1.0 | \$0 | \$0 | \$100,000 | \$100,000 | \$100,000 | \$300,000 |
| Activity 3: Training program for women and youth into cashew cultivation | 0.0 | 1.0 | \$0 | \$0 | \$200,000 | \$200,000 | \$200,000 | \$600,000 |
| Priority 5: National cashew gardens established in designated cashew production zones to facilitate farmers' access to improved planting material | | | \$770,140 | \$770,140 | \$770,140 | \$770,140 | \$770,140 | \$3,850,700 |
| Activity1: make accessible the planting materials by gardens establishment | 0.0 | 1.0 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Activity 2: Technical support to the gardens development | 0.0 | 1.0 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Activity 3: capacity building technical team | 0.0 | 1.0 | \$70,140 | \$70,140 | \$70,140 | \$70,140 | \$70,140 | \$350,700 |
| Grand Total | | | \$5,375,800 | \$5,875,800 | \$5,875,800 | \$5,875,800 | \$5,875,800 | \$28,879,000 |

26.4. FINANCIAL PLAN FOR THE CASH CROPS VALUE CHAIN PROGRAM

The table outlines a comprehensive investment plan aimed at enhancing the value chains of cocoa, coffee, coconut, and cashew in a particular region over a five-year period. It delineates the costs associated with various initiatives within each value chain, such as increasing cultivation, establishing research institutes, and supporting smallholder farmers. Funding for these initiatives primarily comes from the government, alongside international organizations like IFAD, the World Bank, UNIDO, and private sector involvement. The overarching goal is to boost production, enhance research and development, and foster sustainable growth across these key agricultural sectors, ultimately contributing to economic development and livelihood improvement within the region.

Table 57: Financial plan for the cash crops value chain program

| | | | |
|---|------------|--|---|
| COCOA value chain | | | |
| 25,000 ha cocoa landscape cultivation: increase production | 26,250,000 | Government, IFAD, World Bank, UNIDO | 5 |
| National cocoa gardens established in five cocoa-producing counties to provide improved planting materials for cocoa farmers | 3,570,000 | Government, World Bank & IFAD | 5 |
| National cocoa research institute established to support cocoa value chain development | 815,000 | Government, World Bank, IFAD & UNIDO | 5 |
| National cocoa board established to provide guidance for development of the value chain | 640,000 | Government, World Bank, IFAD | 5 |
| Sub-Total | 31,275,000 | | |
| Coffee value chain | | | |
| 15,000 ha coffee landscape cultivation: increase production | 15,750,000 | Government, IFAD, World Bank, UNIDO | 5 |
| Revive the coffee subsector and develop appropriate programs to sustain activities in the sector | 13,500,000 | Government, World Bank, IFAD, ITC | 5 |
| National coffee research institute established to support cocoa value chain development | 3,025,000 | Government, World Bank, IFAD, ITC, UNIDO | 5 |
| Sub-total | 32,275,000 | | |
| Coconut value chain | | | |
| Support cultivation of 2 million new coconut trees in the Southeastern coastal counties of Rivercess, Sinoe, Grand Kru, and Mary Land | 1,396,500 | Government & World Bank and private sector | 5 |
| Private-sector investment facilitated to support local value addition of coconut and coconut by-products | 14,738,300 | Government, World Bank, | 5 |

| | | | |
|--|-----------------------|--|---|
| | | and private sector | |
| National coconut research program developed and supported at the Tubman University (TU) to develop innovation in the coconut industry | 11,586,360 | Government, World Bank, and private sector | 5 |
| Coconut seedling gardens established in four designated counties through private-sector initiative for the production and distribution of improved varieties of coconut seedling | 2,529,540 | Government, World Bank, Private sector | 5 |
| Total | 30,250,700 | | |
| Cashew value chain | | | |
| 10,000 ha of greenfield cashew plantation developed through smallholder support program | 10,5000,000 | Government, IFAD, World Bank & private sector | 5 |
| 5,000 cashew farmers, of which 60% are youth and women trained in cashew cultivation | 5,028,300 | Government, World Bank & other Partners | 5 |
| National cashew production and local value addition expanded through support to private-sector initiative | 8,000,000 | Government, world Bank, other International partners | 5 |
| Cashew research program developed and supported at the Central Agriculture Research Institute (CARI) | 1,500,000 | Government, World Bank & Partners (International) | 5 |
| National cashew gardens established in designated cashew production zones to facilitate farmers' access to improved planting material | 3,850,700 | Government, World Bank & Partners (International) | 5 |
| Sub-total | 28,878,000 | | |
| Grand total | \$122, 678,700 | | |

26.5. RAPID COST-BENEFIT ANALYSIS

The table below presents a rapid cost analysis for investment in the production and sale of agricultural products including cocoa, coffee, coconut, and cashew over a five-year period. It describes the planned expenditure versus income generated annually for each product, showcasing the margins achieved. For cocoa, coffee, coconut, and cashew, the income to be generated each year, the planned expenditure, and the resulting margin are detailed, allowing for an assessment of financial performance. Additionally, the table highlights the total amount invested over the five years and the return on investment, summarizing the overall financial picture of the investment operations and profitability across all value chains.

Table 58: Budget to be invested Vs return on investment

| | Planned expenditure budgeted vs income (benefit obtain) | | | | | |
|-----------------------------|--|--------------------|----------------------|-------------------|-------------------|-----------------------|
| Cocoa | Y1 | Y2 | Y3 | Y4 | Y5 | Total |
| Income | 12,027,000 | 12,027,000 | 19,527,000 | 27,000,000.00 | 34,500,000.00 | 105,081,000 |
| Expenditure | 7,419,000 | 5,964,000 | 5,964,000 | 5,964,000 | 5,964,000 | 31,275,000 |
| Margin | 4,608,000 | 6,063,000 | 13,563,000 | 21,036,000 | 28,536,000 | 73,806,000 |
| Coffee | | | | | | |
| Income | 915460 | 915460 | 5115460 | 9315460 | 13515460 | 29777300 |
| Expenditure | 8875000 | 5850000 | 5850000 | 5850000 | 5850000 | 32275000 |
| Margin | (7,959,540) | (4,934,540) | (734,540) | 3,465,460 | 7,665,460 | (2,497,700.00) |
| coconut | | | | | | |
| Income | 22500000 | 25500000 | 30000000 | 30399000 | 31179000 | 139578000 |
| Expenditure | 5544232 | 5544232 | 6387412 | 6387412 | 6387412 | 30250700 |
| Margin | 16,955,768 | 19,955,768 | 23,612,588 | 24,011,588 | 24,791,588 | 109,327,300 |
| Cashew | | | | | | |
| Income | 30000000 | 36000000 | 45000000 | 45999000 | 47499000 | 204498000 |
| Expenditure | 5375800 | 5875800 | 5875800 | 5875800 | 5875800 | 28879000 |
| Margin | 24,624,200 | 30,124,200 | 39,124,200 | 40,123,200 | 41,623,200 | 175,619,000 |
| Total to be Invested | \$122, 678,700 | | \$285,020,106 | | | |

26.6. RESULTS FRAMEWORK

Table 59: Result Framework for the cash crops value chain program

| Development objective | Indicators | | | Means of verification | Hypothesis | |
|---|---|--|-------------------------------------|-----------------------------|----------------|---|
| establish a modern, resilient, and competitive cocoa and coffee industry where all partners work toward a sustainable cocoa economy that benefits farms, the environment, and communities | % Increase in new planting and rehabilitation resulting to yield increase | 100-200kg/h | 200-300kg/ha | 300-400kg/ha | LISGIS & FAO | Sufficient allocation of funds and assistance from donors |
| Farm level productivity enhancement for yield increase | -% increase in farm yield/ha -Quantity of seed/planting materials supply | - 4009metric tons for cocoa bean - 653 metric ton for coffee bean | 10 % increase in annual metric tons | 15% increase in metric tons | FAO, LACRA CBL | Available budget |

| | | | | | | | |
|--|---|---|--|---|-------------|---|--|
| Strengthen Sustainable cocoa and coffee sector for in confronting climate change | -Increase in household income for smallholders - % increase to GDP - irrigation(borehole) on farm | 0.4% Rainfel l farmin g | 0.6 % contribution to GDP 5% of cocoa farms irrigated | 0.10 % introduction to GDP 10% of farms using borehole as irrigation | CBL, LISGIS | Sustain budget allocation Adequate budget allocation | |
| Research and capacity building : Provide training and capacity-building initiatives for farmers, researchers, extension workers, and other stakeholders to enhance their skills and knowledge in cocoa and coffee research and production, post-harvest handling, and business management. | Trained cocoa and coffee researchers at Graduate level Trained extension officers in cocoa and coffee services | Less than 5 trained researchers | 5-6 person trained for cocoa and coffee research | 5-10 persons trained at MSc level. | CARI & MoA | Sufficient budget to fund the trained | |
| Developmental result | | | | | | | |

| | | | | | | |
|--|----------------------------------|---|-----------------------------|-----------------------------|-----------------|-------------------------------|
| Rise in yield per hectare for smallholder farmers, surpassing current levels. | % increase in annual yield | -4009 tons for cocoa bean -653 tons. Coffee bean | 10% increase in metric tons | 15% increase in metric tons | LACRA, FAO, CBL | Government commitment support |
| Increase in the quantity of cocoa beans produced, surpassing the current trend of production. | Per/ha yield increased | 100-200kg | Increased by 10% | Increased by 20% | MoA, FAO, LACRA | Government continue support |
| Enhancement of cocoa bean quality, elevating the grade from B to A and exceeding current statistics in Liberia | Increased in grade A cocoa beans | Less than what is processes in neighboring country | 20% increase in grade A | 30% increase in grade A | LACRA | Adequate budgetary allocation |

XXVII. RUBBER VALUE CHAIN

27.1. CONTEXT

The agriculture sector in Liberia is a significant sector of the country's economy that contributes 28.9% to GDP. The sector employs more than 70% of the population and provides a valuable export for one of the world's least developed countries⁷. It also forms the basis of many other economies in the world. Liberia is an agrarian economy endowed with enormous agricultural resources that remain underutilized. The country has a comparative advantage in agricultural production, with arable land comprising about 47% (41% upland and 6% lowland) of the total land area. It has fifteen (15) significant rivers and several smaller streams covering 15,049 km² of freshwater that support irrigation infrastructure development to facilitate multiple crop production annually. In addition to its rich water resources, the country enjoys an annual rainfall averaging between 3,810 mm and 4,320 mm, naturally supporting two production seasons. These conditions favor the production of diverse crops and animal species to support the country's food security goal and provide raw materials for agro-industrial development. Despite this potential, the lack of large-scale processing facilities has led to a limited market for agricultural produce, resulting in most of the country's agricultural outputs being utilized in their primary forms.

Despite the potential of Liberia's agriculture sector, the country is in the grip of significant challenges. More than half (50.9%) of the population falls below the poverty line, and over a quarter (39%) experience food poverty. In rural areas, where agriculture is the primary source of livelihood, the poverty rate is a staggering three-quarters (72%), compared to 32% in urban areas. Food poverty is particularly high in rural areas, affecting 51% of the population. These figures underscore the pressing need for immediate investment and policy changes to improve the livelihoods of Liberia's rural population and enhance food security.

Currently, most farming households in Liberia operate at subsistence levels, growing the country's staple food crops: rice (71 percent) and cassava (60 percent). These households also produce a variety of other crops, including legumes (cowpeas, peanuts), vegetables (chili peppers, tomatoes, "bitter ball," eggplant, okra, cabbage, and plantain), roots and tubers (sweet potatoes, yam, eddoes), grains (maize), and fruits (oranges, grapefruits, mango, banana, etc.). This diverse range of crops strengthens household food access and highlights the potential for commercialization and export. However, these opportunities remain largely untapped without the necessary infrastructure and market access.

Given the importance of agriculture to the Liberian economy, successive governments have made tremendous efforts in formulating policies (AfT, LASIP I & II, NRDS, and PAPD) and institutions (LACRA, NSL, CARI, NaFAA, etc.) to develop the sector and fully utilize its potential. However, the sector remains largely dominated by traditional subsistence farming characterized by

⁷ Central Bank Report 2023. Published: March 28, 2024

smallholder farmers with limited access to production inputs as national agriculture outputs remain low. For instance, domestic rice production of the country's staple, rice, remains far below consumption requirement, and food insecurity and poverty remain high among farming households. In 2020, domestic rice production (milled equivalent) was estimated at 180,090 metric tons (MT) cultivated on 240,000 hectares of farmland (FAO, 2021). For the same period, the country recorded a rice balance of 555,000 MT, of which imports constituted about 52 percent, while the combined values of feed and seed accounted for less than 6 percent. In addition to low domestic rice output, yield per cultivated area of the crop remains below regional and global averages. According to an estimate from MOA, rice yield per hectare in Liberia in 2020 was reported at about 1.15 MT (GOL, 2019), which is substantially below the global average yield of 3.9 MT/Ha and the 1.6 MT/Ha average yield recorded in the Mano River Union countries.

The 2022 Liberia Population and Housing Census (LPHC) indicates a total population of 5.3 million. The urban population is more than the rural population by 4.5%. The female population (49.6%) is almost equal to the male population (50.4%). The population under 18 is 2,176,918, while 18 to 34 is 1,737,253, which translates to about three-quarters (74.6%) of the population under 35. For the past decade, Liberia's demographic trend shows a significant annual population growth rate of 2.6%, and its current population density is 56 persons per sq. km. As a result of increased rural-to-urban migration, the rural population of Liberia has declined from 81 percent in 1962 to 45.5 percent in 2022. The corresponding urban population increased from 19 percent in 1962 to 54.5 percent in 2022.⁸

As a result, the agriculture workforce in rural areas has been significantly reduced. Additionally, despite the high youth population, young people prefer other livelihood opportunities than agriculture, such as artisanal mining, commercial motorcycle/tricycle riding, and other quick income-generating activities.

Over the past few years, the government of Liberia has tirelessly worked to develop policies and institutions to enhance the development of the agriculture sector. These efforts have attracted massive investments into the sector. However, the sector remains largely underdeveloped due to numerous constraints, with low productivity and output. These include limited agricultural research and development, inadequate agriculture extension and advisory services delivery, limited access to productive inputs and mechanization, extensive post-harvest losses, inadequate access to agriculture financing, and limited infrastructure to facilitate the supply and distribution of produce.

The Government of Liberia has committed to fully implementing all agriculture sectorial policies and addressing the constraints to the agriculture sector so that Liberians can produce more to feed themselves, generate sufficient income, and improve the livelihood of their families/communities.

⁸ 2022 Liberia Population and Housing Census

Addressing constraints to agriculture development and food security and eventually achieving food sovereignty is an overarching objective of the government of Liberia's national development agenda known as the ARREST.

27.2. JUSTIFICATION OF THE RUBBER VALUE CHAIN PROGRAM

Production: Liberia has a long and proud history of having the largest rubber plantation sector in Africa, which has been the strongest, reliable, and sustainable economic anchor since it began yielding measurable benefits after the 1930s⁹. Rubber is still the number one industry in export earnings and has survived war's ravages¹⁰. Today, this vital industry is facing a severe crisis of profitability and sustainability, and its stakeholders are facing a decisive moment. Besides, the sector has been impacted negatively by a prolonged slump in international rubber market prices, unpredictable reductions in purchases of raw rubber by local processors, and the effects of the Coronavirus pandemic. Liberia's rubber sector has fallen into a recession since 2012. At the same time, many rubber farmers have been forced to stop or reduce production, while a considerable acreage of new plantings that had matured and ready for production cannot be opened. Liberian-owned plantations and processing plants have become burdened by huge debts from local banks, nonbank financial institutions, suppliers' credit, and salary arrears, which they could not settle without considerable government intervention. If left unattended further, the industry that makes significant contributions to the economy would decline irreversibly, causing much harm to the economy and Liberians. Remodeling and repositioning the sector based on a carefully crafted strategic plan using a proactive approach is imperative.

Natural rubber is Liberia's most important agricultural export commodity and a source of income for many rural dwellers. Small and medium farms dominate the sector and cover more than 5 percent of the agricultural land (GoL, 2010). Natural rubber accounted for about 85 percent of the total export earnings from 2003 to 2010. Liberia was ranked the 14th highest producer of natural rubber globally and second in Africa, with overall export data 125,432 metric tons from July 2021 to December 31, 2022¹¹.

Productivity: The summary production quantity of rubber from July 1, 2021, to December 31, 2022, is projected at 122,265 metric tons. Local production is processed into TSR20, principally by Firestone and Liberia Agricultural Company, which are local extensions of multinationals Firestone/Bridgestone (USA/Japan) and the SOCFINCO Group (Belgium), respectively. Semi-processing is also undertaken locally by NRI (Nimba Rubber Inc.) and Jetty Rubber Industries, who purchase local smallholder production. Since 2014, Morris American Rubber's (MARCO)

⁹ RPAL Report 2023

¹⁰ Liberia Rubber Master Plan 2020

¹¹ LEITI FY 2021-2022

6,000-acre plantation has shut down processing at its 1.5tph plant. As of January 2022, latex/cup lump production at this farm has ceased.

Over time and with replanting, the major processors have relied on their plantations, leaving local farmers with limited options: either accept the low farm gate price or sell to off-takers who are also semi-processors. These off-takers ship (cup lump) to Southeast Asian processors under the category not especially specified (NES). This unfortunate state of affairs has decreased domestic rubber production as farmers close their farms due to unfavorable operating conditions.

Over the years, natural rubber production in Liberia has varied significantly. Production decreased from 1972 to 2021, ending at 90,800 metric tons in 2021. There was a 15.2% decline in production compared to the third quarter of 2019.

According to the Central Bank of Liberia (CBL), rubber output fell by 2.0% to 63,211 metric tons in 2022. This was due to a decrease in farmers' (small and large producers) harvests.

Liberia's rubber sector is plagued with numerous challenges. The challenges critical to investment promotion for Liberia's rubber sector include limited and underutilized infrastructure; the high cost of utilities, human resources, and low workforce capacity; poor access to markets; an underdeveloped financial sector with limited innovative financial products; poor public-private partnerships; unsupportive and unmotivated government extension workers and cumbersome administrative procedures; lack of insight by policymakers into industry dynamics; and generally poor work ethics among workforce leading to poor productivity, quality, and weak cost competitiveness. Also, low local market prices discourage farmers from opening their farms. The few local processors offer farm gate prices, which make farm operation marginal at best and, at worst, closure. The few self-motivated rubber farmers who develop the courage to continue their rubber farming operations cannot invest in cultivating improved clones or expanding the areas under production. Continued farm closures and limited value-addition facilities have led to the local economy's inability to stabilize export earnings from this strategic national resource.

Another primary concern for the subsector is farmers' advanced age. Judging by experience, the average age of Liberian farmers is 40 and above. Yet Liberia does not have a strategic approach to attracting youth and women to this lucrative subsector.

Investing in Liberia's rubber subsector not only presents a promising business opportunity but also a chance for personal growth and success. Despite its challenges, the sector holds significant growth potential, which can be harnessed through production stabilization and maximizing economic benefits. By strengthening value addition, enhancing productivity, and exploring new global markets, investors can pave their way to a prosperous future. Commercial rubber farmers are estimated to employ 20,000 people, while 35,000 smallholder farmers produce rubber nationwide.

Firestone, the natural rubber concession and the world's largest contiguous natural rubber operation (covering almost 200 square miles) is Liberia's biggest private sector employer (Liberia 16th EITI report).

Liberia's rubber is the second most exported foreign exchange-earning cash crop, yet value addition takes place only to the extent needed for exporting. The subsector offers numerous opportunities for investment in secondary processing activities such as the production of i) all types of tires and tubes, ii) inflatable rubber products, iii) automotive and other molded rubber parts, iv) medical and surgical rubber products, and v) rubber-made sporting goods.

Rubber significantly contributes to Liberia's economy, with exports valued at 112.7 million dollars in 2022. This made Liberia the 15th largest natural rubber exporting country globally. Agriculture is the primary economic sector in the country, providing livelihood for more than 68% of Liberia's population and contributing 28.9% of GDP. As one of Liberia's traditional revenue sources, natural rubber accounted for 12.5% of the country's total exports in 2021. Thus, natural rubber is not just a crucial export commodity but also a key player in supporting Liberia's economic growth.

- *Food security:* Liberia is highly dependent on food imports. By strengthening local agricultural value chains, the country can increase its food production and reduce its dependence on imports, thereby helping to strengthen its food security.

Over the years, there has been a significant expansion of land cultivated for rubber production by smallholder farmers, the higher rubber producers in Liberia. Over 60,000 smallholder rubber farmers depend on natural rubber for their livelihood, and multinational rubber companies employ more than 20,000 people. The crop is one of the tree crops with high commercial value. The expansion of rubber farms is likely to contribute to an increase in yield that translates to an increase in household income. Income earned from rubber cultivation enhances household access to food and improves household food and nutrition security. Income earned from rubber can also contribute to production diversity or investment into other agriculture enterprises that significantly impact household food and nutrition security. Different derivatives of rubber enhance the income of actors within the value. The increase in income of these actors can also improve their level of food security.

- *Poverty reduction and youth employment:* Investing in agricultural value chains can help Liberia's small-scale farmers increase their incomes, helping to reduce poverty and improve living conditions for rural populations.

Estimates suggest that rubber contributes 61% of all export earnings and serves as the largest employer in Liberia, providing jobs to approximately 80,000 people (around 20,000 on concessions and large commercial farms and 60,000 on smallholder farms). Rubber has contributed significantly to Liberia's revenues and job creation, especially in rural areas. It is a strategic commodity crop in Liberia, supporting the rubber-based industries and being one of the

primary sources of income for rural smallholders. Cultivating natural rubber has been advocated to alleviate poverty and foster rural development.

- *Economic diversification*: By developing agricultural value chains, Liberia can diversify its economy and reduce its dependence on extractive industries, which can make the economy more resilient to external shocks.

The new Liberian government is pursuing a strategy of diversifying the economy to achieve sustainable economic growth and strengthen resilience to external shocks. The current government has underscored the importance of attracting foreign and private investment in the agriculture sector because it provides the necessary capital and expertise to develop the sector sustainably. Regarding the natural rubber subsector, there are numerous opportunities for investment in secondary processing activities, including manufacturing all types of tires and tubes, inflatable rubber products, automotive and other molded rubber parts, medical and surgical rubber products, and rubber-made sporting goods. Sustainable engagement in these viable economic ventures in the rubber sector could drive the nation away from over-dependence on extractive industries for foreign exchange earnings and enhance the nation's resilience to external factors.

- *Supporting sustainable agriculture*: Investing in agricultural value chains can help to promote sustainable and environmentally friendly agricultural practices, which is essential to ensure.

The rubber sector supports sustainable economic growth and development with consideration for the criteria outlined under principles 3 and 4 of the Preferred by Nature Sustainability Framework <http://www.preferredbynature.org/> as follows:

- Principle 3 - ensures that nature and environment are protected through sustainable climate-smart approaches such as i) Forests and other ecosystems are not converted, ii) Natural forests and other ecosystems are not degraded, iii) Ecosystem and biodiversity values are identified and protected, iv) Chemicals are used responsibly with minimal negative impacts, v) Waste is reduced and managed responsibly, vi) Pollution is minimized or prevented, vii) Water resources are protected and used efficiently, viii) Soil is conserved and managed appropriately, and ix) Animal welfare and health are secured.
- Principle 4 ensures that climate impacts are reduced and mitigation enforced to reduce greenhouse gas emissions. Additionally, it ensures that climate change adaptation efforts are proportional to the risk and that GHG removal and ecosystem restoration efforts are aligned with the target set in the revised Liberia's Nationally Determined Contribution (NDC).

27.3. THEORY OF CHANGE FOR THE RUBBER VALUE CHAIN

- Creating the enabling environment for natural rubber production, value addition, and marketing
- Improving the productive competitiveness of Liberia’s natural rubber farmers through investment in the cultivation of improved clones
- Diversifying the rubber subsector for investment opportunities in secondary processing activities such as manufacturing all types of tires and tubes, inflatable rubber products, automotive and other molded rubber parts, medical and surgical rubber products, rubber-made sporting goods, etc.;
- Making rubber farming attractive for youth and women by introducing innovative technologies (mechanization, training, irrigation, etc.)
- Providing productive input support to smallholder rubber farmers (aces to finance, training, mechanization, fertilizers and agrochemicals, extension and advisory services, etc.)

Table 60: Theory of Change of the Rubber Value Chain in Liberia

| Main Issues to be Solved to Boost Rubber Development | The transformation or change to develop | The results of these transformations or change | Main Agents of Change or Transformation | what assumptions will drive change (political will of the Government, the commitment of technical and financial partners, participation of young people and women, etc.) | The impacts and links with the Global Government economic policies |
|--|--|---|---|--|--|
| Poor environment for business to start and thrive | Enhancing relevant state and non-state actor’s participation | Improved enabling environment for Liberia’s natural rubber value chain development. | MOA and relevant MACs, CSOs | National stability, commitment of GOL institutions, and participation of civil society organizations | |

| | | | | | |
|--|---|---|---|---|--|
| Low competitiveness of Liberia's natural rubber farmers | Support smallholder farmers with improved rubber clones and facilitate farmers' access to appropriate training and finance | Improve clones plant and result in higher yield per hectare. | Improve clones plant to enhance productivity. | | SDG-8 – promoting inclusive, sustainable economic growth and empowerment |
| Weak diversification of the rubber subsector | Grouping rubber farmers into production and marketing cooperatives Ensuring/monitoring Concessionaires to abide by their contract | Increase yield Enhance Economic of scale that brings a reduction in transaction costs Improve bargaining power Improve bargaining power Establishment of processing facilities Production of secondary rubber products | CDA, MOA, MOC, Internal Affairs, Land Authority, MOJ, | The government will create an enabling environment Political and social unrest does limit cooperatives and concessionaires from positive change No major disasters, hazards, pandemics, and weather affect water availability | SDG-8 – promoting inclusive, sustainable economic growth and empowerment |
| Weak farmers' access to Providing productive input (aces to finance, training, mechanization, fertilizers and agrochemicals, extension and advisory services, etc. | Facilitate farmers' access to appropriate farming inputs. Establishment of an improved bud wood garden for multiplication and distribution to farmers. Developed customized types and doses of fertilizers. Provide rubber cups, cup wires, tapping knives and spikes, and formic acid. | Higher yield and increased income | | | SDG-8 – promoting inclusive, sustainable economic growth and empowerment |
| | <i>Changing the mindset</i> of youth, who perceive agriculture as a poor man's job and endless suffering | | | | |

| | | | | | |
|--|--|---|--|---|--|
| Weak farmers' access to innovative technologies (mechanization, training, irrigation, etc.) | Introducing <i>mechanization</i> for rubber farming operations | Youth-driven rubber production, improved productivity, sustainable functioning of youth in viable rubber farming operations, enhanced business engagement at the stages of the rubber value chain – <i>A change in the narrative and a paradigm shift for youth</i> | GoL (MOA & relevant MACs), Development Partners (UN, WB, AfDB, USAID, CHINA AID, AFD, GIZ, SIDA, etc.) | GOL commitment & national stability, commitment of Development Partners, youth participation in the subsector | Sustainable source of livelihood for youth, SDG-8 – promoting inclusive, sustainable economic growth and empowerment |
| | <i>Empowerment of youth</i> for rubber value addition | | | | |
| | <i>Capacity Building of youth for Productive Marketing</i> | | | | |

27.4. THE DEVELOPMENT OBJECTIVE

The development objective for the rubber value chain is:

- To improve farmers' and agribusiness enterprises' productivity and market access. This would contribute to sustainable economic development, poverty reduction, and youth and women employment.

Specific Objectives

- Creating the enabling environment for improved natural rubber production and productivity, value addition, and marketing
- Improving production and productivity of the rubber sector
- Accelerating domestic-level value addition and marketing

27.5. COMPONENTS

In each component, you will describe all the technical, institutional, infrastructural, and capacity-building actions required as investments, give the quantities required, define who will carry them out, and define where they will be carried out in Liberia. You will also define how much it will cost.

Three (3) Components identified and deemed adequate to support the plan's successful implementation are:

- Creating the enabling environment for improved natural rubber production and productivity, domestic value addition, and marketing
- Improving production and productivity of the rubber sector
- Accelerating domestic-level value addition to rubber

27.5.1. **Component 1: Creating the enabling environment for improved natural rubber production and productivity, value addition, and marketing**

The primary goal of this component is to improve a conducive business environment for the rubber sector to thrive. It will facilitate the capacity strengthening of relevant state and non-state actors to i) deliver quality services to investors, ii) conduct demand-driven research to generate appropriate technologies, and iii) support the transfer of technologies to rubber farmers and processors.

This component has targeted outcomes/results to deliver, each designed to contribute to attaining the component's goal.

KRA-1: Strengthened capacity of relevant public institutions to provide quality services for enhanced production, value addition, and marketing —The plan will not only enhance the capacity of relevant public institutions whose services enable rubber businesses (production, processing, and marketing) but also pave the way for a more robust and prosperous rubber industry in Liberia. Through policy engagement and support for policy reform and strategic plan for implementation (policy on local-foreign partnership and export of raw rubber), the services of

MOA, CDA, and MOCI will be instrumental in this transformation. The component will take action to improve the quality of its services, thereby instilling a sense of optimism and hope in the industry stakeholders and potential investors.

KRA-2: Enhanced value chain coordination and public-private dialogue—This KRA aims to map stakeholders and create a system of effective and sustainable Public-Private Dialogue (PPD). This collaborative approach involves all stakeholders, including government officials and non-state actors, to ensure effective coordination and dialogue for enhanced rubber sector performance, making each participant feel included and valued.

KRA-3: Enhanced agricultural research and extension services delivery- This KRA will strengthen the MOA's capacities through its DRDRE and DTS, CARI, and the agriculture arms of the County Colleges, particularly those in the rubber zone. This institutional capacity-strengthening initiative will facilitate linkages between extension and rubber development research and rubber planting material multiplication and distribution to farmers.

This requires the conduct of a deep assessment of the institutions' needs (MOA/DRDRE, CDA, CARI, RPAL), after which support packages are prepared and delivered to the institutions (training, logistics, financial assistance, etc.).

27.5.2. Component 2: Improving production and productivity of the rubber sector

This component is dedicated to enhancing the capacity of smallholders and commercially focused rubber farmers, with a special focus on the inclusion and empowerment of youth and women. Their active participation in all stages of rubber production, from nursery development to new planting and rehabilitation of old farms, is a key priority of the component. This approach is underpinned by our commitment to ecosystem and environmental considerations.

Many youths shun agriculture, often labelling it a “Poor Man’s Job.” However, with the right strategies and innovative technologies, we can change this perception and showcase the potential of agriculture to transform livelihoods. Despite the high youth population, Liberia’s young people prefer other livelihood opportunities than agriculture, such as artisanal mining, commercial motorcycle/tricycle riding, and other quick income-generating activities. Similarly, Liberia’s women contribute over 60 percent of the labor force in food production, processing, preservation, marketing, and preparation, yet they are not part of key agricultural decision-making processes (World Bank 2012). Therefore, a study is proposed to strategize the sustainable involvement of youth and women in agriculture. The study will recommend actions to attract women and youth to agriculture, unlock great opportunities, and point to potential financing sources that youth and women can access. Furthermore, the study will recommend innovative gender-friendly farming technologies (access to farm machines, improved planting material, quality fertilizers and agrochemicals, improved planting and management practices, etc.) over the rudimentary tools that make farming unattractive for youth and women. Youth and women will be introduced to doing agriculture as a business through entrepreneurship skills development and incentivized to add

value to rubber and marketing. They will be seen successfully operating at the various stages of the rubber value chain.

The farmers will be supported to improve their productive competitiveness through investment in i) the cultivation of improved clones involving the development of clone garden(s), multiplication of improved clones, and distribution of improved clones to farmers; ii) the provision of productive input support to farmers (access to finance, mechanization support, fertilizers, and agrochemicals, extension, and advisory services, etc.); iii) attracting women and youth involvement in rubber farming through the introduction of innovative technologies (mechanization, irrigation, access to finance, etc.); iv) the introduction of a tailor-made sustainable financing scheme to improve/increase farmers' access to finance-loan or grant; and v) the provision of appropriate training tailored to address the specific needs of farmers to improve their production and productivity.

10.5.2.1. Key Result Areas of Component 2:

The following Key Result Areas (KRA) have been identified for implementation to achieve the desired result and impact of Component 1:

KRA-1 - *Enhanced farmers' access to Improved clones* – training, nursery development, multiplication, and distribution to farmers

KRA-2 – *Procurement and distribution of Productive Inputs to farmers* - such as access to farm equipment or machines, fertilizers and agrochemicals, extension and advisory services, etc.

KRA-3 – *Introduction of innovative technologies for enhanced rubber farming* – youth and women attraction to rubber farming - mechanization, irrigation, etc.

KRA-4 – *Improved farmers' and processors' access to finance* – tailored-made financing initiative for farmers and processors – Grant, Loan, or both

Farmers in the rubber-belt counties of Nimba, Bong, Margibi, Grand Bassa, Maryland, and Montserrado are targeted to benefit from services and support provided under this component. However, farmers in other counties of Liberia showing keen interest in rubber farming will be identified and supported.

Fully Covered Under Component One: Institutions that have direct supervision, advisory, organizational, and coordination responsibilities for strengthening farmers' capacity to improve their production and productivity will be supported through partnership arrangements to participate in implementing activities or initiatives proposed in the plan. A rapid needs assessment will be conducted for each potential partnering institution (MOA, CDA, RDF, CARI, RPAL, NaRBFUL., AIDL, etc.) to strengthen their capacity for enhanced service delivery to rubber producers.

27.5.3. Component 3: Accelerating domestic-level value addition and marketing

This component aims to enable smallholder farmers, their organizations, and other value chain participants/stakeholders to invest in profitable value addition and agro-processing facilities in rubber to increase profitability and domestic farmers' incomes. A key objective of this component is to transition subsistence farmers into commercial farmers, and this will require a ready market if it is to succeed.

The component will implement activities envisaged to have the potential to boost increased private investment and innovative value addition to rubber in Liberia. Below are the targeted Key Result Areas (KRA) to be achieved under this component.

KRA-1: Enhanced private sector investment in value addition through PPP promotion - This rubber plan will adopt the PPP approach as the preferred modality for interventions to promote value addition. The plan targets the establishment of 50 PPPs over the 5 years.

KRA-2: Strengthened capacity of 10,000 smallholder rubber farmers and 200 SMEs in quality standards and market requirements of rubber and derivatives - This plan will facilitate capacity building for farmers' organizations, promote the adoption of innovative technologies for enhanced value addition, and promote infrastructural development (storage, processing facilities, etc.).

KRA-3: Enhanced 10,000 smallholder rubber farmers and 200 SMEs access to finance (value addition) - This plan will support the integration of farmers and value-addition enterprises into the rubber value chain operatives.

The technologies (training, machines, finance, etc.) to be provided under this component will benefit farmers in the rubber-belt counties of Nimba, Bong, Margibi, Grand Bassa, Maryland, and Montserrado. It will also benefit farmers from other countries of Liberia, showing keen interest in rubber farming.

KRA-4: Increased rubber manufacturing in Liberia—Eleven (11) rubber manufacturing and processing factories, comprising 3 new and 8 existing factories, were constructed and modernized, respectively. These processing rubber factories will improve smallholder farmers' access to the market and increase their income.

27.6. EXPECTED RESULTS

The expected results have to be measurable and quantitative and should not exceed 5 results per value chain, given the high cost of their evaluation. They may relate either to levels of increase in production, productivity, or marketable quantities,

It is expected that the support of and successful implementation of the plan will produce the following outcomes/results:

- 20,000 hectares of new smallholder rubber farms established in the 6 major rubber-producing counties through the supply of improved and high-yielding clones -

- 10,000 hectares of existing farms rehabilitated in six rubber-producing counties -
- National rubber research institute established to stimulate innovation development in the rubber industry
- Capacity of 15 local rubber value addition strengthened through increased access to unprocessed rubber (latex and cuplum)

27.7. BUDGET FOR THE RUBBER VALUE CHANGE DEVELOPMENT

Table 61: Investment Cost of the Rubber value chain

| | COMPONENTS AND ACTIVITY | | PERIOD OF IMPLEMENTATION | | | | | |
|------------|--|--------------------------------------|--------------------------|-------------|-------------|-------------|-------------|-------------------|
| | Activity | Allocation by Component and Activity | Yr-1 (US\$) | Yr-2 (US\$) | Yr-3 (US\$) | Yr-4 (US\$) | Yr-5 (US\$) | Total Cost (US\$) |
| | COMPONENT 1: Support creating the enabling environment for improved natural rubber production and productivity, value addition, and marketing by strengthening the capacity of 5 institutions (4 existing and 1 to be established), including MOA, MOCI, CARI, RPAL, and NRRI establishment: \$1,575,000.00 | \$ 1,575,000.00 | | | | | | |
| Activity 1 | Strengthen the capacity of 5 existing public institutions (MOA, MOCI, CARI, and RPAL) to provide quality services for enhanced production, value addition, and marketing - enabling business environment. | \$ 630,000.00 | 441,000.00 | 189,000.00 | | - | - | 630,000.00 |
| Activity 2 | Support the establishment and functioning of the National Rubber Research Institute | \$ 945,000.00 | \$ 283,500.00 | 661,500.00 | - | - | - | 945,000.00 |

| | | | | | | | | |
|------------|---|------------------|--------------|---------------|---------------|---|------|---------------|
| | (NRRI) to stimulate innovation development in the rubber industry | | | | | | | |
| Subtotal | | | | | | | | 1,575,000.00 |
| | COMPONENT 2: Promote improving the rubber sector's production and productivity by supporting the cultivation of 20,000 hectares in improved and high-yielding clones for 4,000 smallholder rubber farmers, and rehabilitation of 10,000 hectares of rubber farms for 2,000 smallholder farmers. | \$ 48,300,000.00 | | | | | | |
| Activity 1 | Support the cultivation of 20,000 hectares in improved and high-yielding rubber clones for 4,000 smallholder farmers in the 6 major rubber producing counties | \$ 36,225,000.00 | 3,622,500.00 | 21,735,000.00 | 10,867,500.00 | - | \$ - | 36,225,000.00 |
| Activity 2 | Support the rehabilitation of 10,000 hectares of rubber farms for 2,000 smallholder farmers in the major rubber producing counties | \$ 12,075,000.00 | 1,207,500.00 | 7,245,000.00 | 3,622,500.00 | - | \$ - | 12,075,000.00 |
| Subtotal | | | | | | | | 48,300,000.00 |

| | | | | | | | | |
|------------|---|-----------------|--------------|------------|------------|--------------|------|--------------|
| | COMPONENT 3 - Support accelerating local rubber manufacturing/processing and marketing by enhancing the capacity of 15 existing rubber manufacturing/processing firms to increase and improve local value addition to rubber in the 6 major rubber-producing counties. Thus, this will be a significant off-taker for smallholder rubber farmers. | \$ 2,625,000.00 | | | | | | |
| Activity 1 | Support the modernization and operationalization of fifteen (15) existing rubber processing factories (facility rehabilitation, equipment purchases and installation) | \$ 1,706,250.00 | 853,125.00 | 853,125.00 | - | \$ - | \$ - | 1,706,250.00 |
| Activity 2 | Improve and increase 15 local rubber manufacturing/processing firms' access to finance to purchase raw rubber (latex, cuplum) from farmers for processing. | \$ 840,000.00 | \$ - | 672,000.00 | 126,000.00 | \$ 42,000.00 | \$ - | 840,000.00 |
| Activity 3 | Support the 15 plan-supported rubber manufacturing/processing firms to diversify value addition to rubber in Liberia (training, technology adoption and | \$ 78,750.00 | \$ 35,437.50 | 43,312.50 | - | \$ - | \$ - | 78,750.00 |

| | | | | | | | | |
|------------------------------|---|--|--|--|--|--|--|----------------------|
| | upskilling, knowledge exchange programs, etc.) | | | | | | | |
| Subtotal | | | | | | | | 2,625,000.00 |
| TOTAL INVESTMENT COST | | | | | | | | 52,500,000.00 |

27.8. THE IMPLEMENTATION ARRANGEMENTS PLAN

27.8.1. National Agriculture Steering Committee (NASC)

This committee is headed by H/E, the President of the Republic of Liberia, and includes Heads of line Ministries, Agencies, and Commissions (MACs). It is the highest decision-making body for the NAIP. The pivotal role of the committee is to exercise oversight responsibility and create conditions suitable for the sector's growth and development.

The *terms of reference* (TOR) of the committee include but are not limited to the following: i) ensuring an enabling environment that attracts private investment for improved production and productivity, accelerated value addition, and enhanced marketing of rubber and its derivatives, ii) hosting an annual forum for stakeholders' dialogue to review the sector's performance, seek joint-sectoral solutions to critical challenges impacting the rubber sector's performance, and iii) establishing Action Points for the advancement of the sector. The NASC shall meet once a year with the Minister of Agriculture serving as Secretary.

27.8.2. National Implementation Coordination Committee (NICC)

MoA, with its overall responsibility for implementing the Rubber Value Chain Development Plan (RVCDP), recognizes the crucial role of the NICC. This committee, headed by the Minister of Agriculture, will exercise strategic oversight of the Plan. Comprising representatives of relevant government institutions, the private sector, and non-state actors, the NICC's decisions and actions will significantly impact the plan's success. The committee will meet twice a year, with the possibility of an extraordinary meeting depending on the situation and approved by 2/3 of the membership. The entities involved in the plan's implementation are (i) The Ministry of Agriculture for the leadership role, ii) the Ministry of Commerce and Industry (MoCI) for activities focused on connecting producers to traders and processors and supporting standardization, quality control, and certification; (iii) the Ministry of Finance and Development Planning to carry out project activities related to policy coordination among ministries and agencies; (iv) CDA for project activities designed to strengthen capacity (cooperative leadership, governance, etc.) of rubber FBOs and cooperatives, v) CARI and Tertiary institutions for research and support for technology transfer, private sector for driving investment in the rubber subsector, and non-state actors as "pressure group" ensuring commitments by all parties to the plan's implementation partnership.

Terms of reference (TOR) - The NICC will perform a management role, skilfully guiding the plan's implementation toward attaining the desired outcome and impact. Its tasks will include but are not limited to i) ensuring the plan's implementation complies with the NASC's established rules and regulations, ii) motivating partnering institutions to perform their respective roles, iii) ensuring the conduct of regular plan implementation support by the NASC, with focus on coordination, supervision, monitoring, and evaluation of the plan, iv) reviewing to adjust the annual plan implementation progress reports and submit same to the NASC, and v) supporting the NASC in resource mobilization efforts.

27.8.3. Rubber Plan Implementation Office (RPIO)

The MOA will execute the plan through its **Rubber Plan Implementation Office (RPIO)**, a key component in the Department of Planning and Development (DPD). Operating under the direct

supervision of the Deputy Minister for Planning and Development, the RPIO plays an essential role in the plan's day-to-day coordination and management. The RPIO, led by a **National Coordinator (NC)**, is responsible for ensuring the smooth operation of the plan's implementation. He/she will be supported by the MOA's M&E Specialist, Procurement Specialist, Financial Management Specialist, and the Internal Audit unit. However, the RPIO will be strengthened with an M&E Assistant, a Procurement Assistant, and an Accountant. The National Coordinator is a qualified program implementation specialist with excellent program and project design, monitoring, and evaluation knowledge. Administratively, the NC reports directly to the Deputy Minister for Planning and Development.

Terms of Reference - The tasks of the RPIO include but are not limited to i) inducing innovation at all stages of the rubber value chain, ii) promoting investment in the subsector through PPP arrangement, direct private investment interest, improving stakeholders' access to finance, etc., iii) motivating state and non-state actors to perform their roles dutifully, iv) assisting stakeholders in identifying opportunities and exploring them to their benefit and the benefit of the subsector - exploring new avenues for viable business engagement, v) supporting stakeholders in designing salable business plans (BPs), vi) monitoring and evaluating the subsector's performance, vii) preparing and submitting sector's progress reports (based on schedule) to the Deputy Minister for Planning and Development for onward submission to the NICC, viii) and making recommendations for the development of Liberia's rubber subsector.

27.9. THE FINANCING PLAN

Table 62: Financing plan of the rubber value chain

| S/N | COMPONENT & ACTIVITY | INVESTMENT CONTRIBUTIONS | | | | |
|-----------------|--|--------------------------|--------------------|----------------|-------------|-------------------|
| Key Result Area | | Gov. of Lib | Int. Dev. Partners | Private Sector | Farmer Org. | Total Cost (US\$) |
| | COMPONENT 1: Support creating the enabling environment for improved natural rubber production and productivity, value addition, and marketing by strengthening the capacity of 5 institutions (4 existing and 1 to be established), including MOA, MOCI, CARI, RPAL, and NRRI establishment. | | | | | |
| Activity 1 | Strengthen the capacity of 5 existing public institutions (MOA, MOCI, CARI, and RPAL) to provide quality services for enhanced production, value addition, and marketing - enabling business environment. | \$ 63,000.00 | 567,000.00 | - | - | \$ 630,000.00 |

| | | | | | | |
|------------|---|--------------|---------------|--------------|---|---------------|
| Activity 2 | Support the establishment and functioning of the National Rubber Research Institute (NRRI) to stimulate innovation development in the rubber industry | \$ 94,500.00 | 850,500.00 | - | - | \$ 945,000.00 |
| Subtotal | | 157,500.00 | 1,417,500.00 | - | - | 1,575,000.00 |
| | COMPONENT 2: Promote improving the rubber sector's production and productivity by supporting the cultivation of 20,000 hectares in improved and high-yielding clones for 4,000 smallholder rubber farmers, and rehabilitation of 10,000 hectares of rubber farms for 2,000 smallholder farmers. | | | | | |
| Activity 1 | Support the cultivation of 20,000 hectares in improved and high-yielding rubber clones for 4,000 smallholder farmers in the 6 major rubber producing counties | 724,500.00 | 28,980,000.00 | 6,520,500.00 | - | 36,225,000.00 |

| | | | | | | |
|---------------|---|------------|---------------|--------------|---|---------------|
| Activity 2 | Support the rehabilitation of 10,000 hectares of rubber farms for 2,000 smallholder farmers in the major rubber producing counties | 241,500.00 | 9,660,000.00 | 2,173,500.00 | - | 12,075,000.00 |
| Subtotal | | 966,000.00 | 38,640,000.00 | 8,694,000.00 | - | 48,300,000.00 |
| | COMPONENT 3 - Support accelerating local rubber manufacturing/processing and marketing by enhancing the capacity of 15 existing rubber manufacturing/processing firms to increase and improve local value addition to rubber in the 6 major rubber-producing counties. Thus, this will be a significant off-taker for smallholder rubber farmers. | | | | | |
| Activity 1 | Support the modernization and operationalization of fifteen (15) existing rubber processing factories (facility rehabilitation, equipment purchase and installation) | 17,062.50 | 1,535,625.00 | 153,562.50 | - | 1,706,250.00 |

| | | | | | | |
|--|--|-----------|--------------|------------|---|----------------------|
| Activity 2 | Improve and increase 15 local rubber manufacturing/processing firms' access to finance to purchase raw rubber (latex, cuplum) from farmers for processing. | 8,400.00 | 756,000.00 | 75,600.00 | - | 840,000.00 |
| Activity 3 | Support the 15 plan-supported rubber manufacturing/processing firms to diversify value addition to rubber in Liberia (training, technology adoption and upskilling, knowledge exchange programs, etc.) | 787.50 | 70,875.00 | 7,087.50 | - | 78,750.00 |
| Subtotal | | 26,250.00 | 2,362,500.00 | 236,250.00 | - | 2,625,000.00 |
| TOTAL (Investment Cost for 5 years) | | | | | | 52,500,000.00 |

27.10. RAPID COST-BENEFIT ANALYSIS

Table 63: Cost benefit for the rubber value chain development

| Activity | Present Value of Future Cost | Future Benefits | Present Value of Future Benefit | Benefit-Cost Ratio |
|---|------------------------------|--|---------------------------------|--------------------|
| Strengthen the capacity of five existing public institutions (MOA, MOCI, CARI, and RPAL) to provide quality services that enhance production, value addition, and marketing, enabling a business environment. | \$ 630,000.00 | Successfully implemented reformed GoL policies and strategies create the enabling business environment, and rubber producers and value addition enterprises are thriving | \$ 1,102,500.00 | 1.75 |
| Support the establishment and functioning of the National Rubber Research Institute (NRRI) to stimulate innovation development in the rubber industry | \$ 945,000.00 | Increasing technology adoption and upscaling rate by rubber producers and manufacturing/processing firms, enhancing production, productivity, and diversified local value addition to rubber | \$ 1,701,000.00 | 1.80 |
| Support the cultivation of 20,000 hectares in improved and high-yielding rubber clones for 4,000 smallholder farmers in the 6 major rubber-producing counties | 36,225,000.00 | 20,000 hectares under cultivation in the 6 major rubber-producing counties, offering high prospects for a future boost to rubber production and raw rubber availability for local manufacturing/processing | \$ 56,148,750.00 | 1.55 |
| Support the rehabilitation of 10,000 hectares of rubber farms for 2,000 smallholder farmers in the major rubber-producing counties | 12,075,000.00 | 10,000 hectares of rubber farms rehabilitated in the 6 major rubber-producing counties, steadily contributing to raw rubber supply to local processing firms - increased processors' access to unprocessed rubber. | \$ 19,923,750.00 | 1.65 |

| | | | | |
|--|----------------------|--|-------------------------|-------------|
| Support the modernization and operationalization of fifteen (15) existing rubber processing factories (facility rehabilitation, equipment purchase, and installation) | 1,706,250.00 | 15 local rubber manufacturing/processing facilities have modernized and are adding value to rubber, with diversification. | \$ 3,156,562.50 | 1.85 |
| Improve and increase 15 local rubber manufacturing/processing firms' access to finance to purchase raw rubber (latex, cuplum) from farmers for processing. | 840,000.00 | 15 local rubber manufacturing/processing firms are accessing finance and expanding their manufacturing operations - major off-takers for smallholder rubber farmers. | \$ 1,428,000.00 | 1.70 |
| Support the 15 plan-supported rubber manufacturing/processing firms to diversify value addition to rubber in Liberia (training, technology adoption and upskilling, knowledge exchange programs, etc.) | 78,750.00 | 15 capacity-strengthened local rubber manufacturing/processing firms diversifying operations and are introducing new brands of rubber products (made in Liberia). | \$ 137,812.50 | 1.75 |
| | 52,500,000.00 | | \$ 83,598,375.00 | 1.59 |

NOTE: The Internal Rate of Return is projected at 59% for the 5 years (the project life span). It is expected that this will double after the targeted 5 years.

27.11. RESULT-BASED FRAMEWORK

Table 64: Result Framework of the Rubber Value Chain

| Indicator | Baseline | Midline Target | End Plan Target |
|---|----------|----------------|-----------------|
| Program Development Objective: Improve Productivity and Market access for rubber farmers and Agribusiness enterprises | | | |
| Area under cultivation - new planting in improved and high-yielding clones (Number –Ha.) | 0 | 12,000 | 20,000 |
| Area rehabilitated – existing rubber farms (Number) | 0 | 6,500 | 10,000 |
| Farmers adopting innovative technologies - disaggregated by women & youth (Number) | 0 | 4,000 | 6,000 |
| Yield of rehabilitated rubber farms (target of 2.0 from 1.4 MT) – supported farmers (Percentage change) | 0 | 65 | 100 |
| Volume of sales of rubber produced by supported farmers (Percentage change) | 0 | 65 | 100 |
| Local rubber manufacturing/processing firms modernized - (Number) | 0 | 10 | 15 |
| Component 1: Creating the enabling environment for improved natural rubber production and productivity, value addition, and marketing | | | |
| Public institutions capacity strengthened - (Number) | 0 | 4 | 5 |
| Policy and strategy reformed and implemented (number) | 0 | 2 | 2 |
| Establishment of the National Rubber Research Institute (NRRI) - (Number) | 0 | 1 | 1 |
| Component 2: Improving production and productivity of the rubber sector | | | |
| Area cultivated in improved and high-yielding clones in the 6 major rubber-producing counties - (Hectare) | 0 | 12,000 | 20,000 |
| Area rehabilitated – existing rubber farms in the 6 major rubber-producing counties - (Hectare) | 0 | 6,500 | 10,000 |
| Farmers received improved clones and other productive inputs disaggregated by types - (Number) | 0 | 4,000 | 6,000 |
| Rubber producers adopting improved technologies – (Number) | 0 | 4,015 | 6,015 |
| Rubber farmers accessing finance- (Number) | 0 | 4,015 | 6,015 |

| | | | |
|--|---|----|-----|
| Volume of sales of rubber produced by supported farmers (Percentage change) | 0 | 65 | 100 |
| Specific Objective 3 - Enhancing capacity for investment in manufacturing/processing rubber-based products in Liberia (secondary processing activities). | | | |
| Existing rubber factories modernized - (Number) | 0 | 10 | 15 |
| Local rubber firms adding value to rubber - (Number) | 0 | 15 | 15 |
| Local rubber firms accessing finance - (Number) | 0 | 15 | 15 |
| Volume of sales of rubber derivatives by supported manufacturer/processor - (Percentage change) | 0 | 65 | 100 |

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**CHAPTER THREE: FRUIT CROPS VALUE CHAIN
PROGRAMS**

XXVIII. FRUIT CROPS VALUE CHAIN

28.1. CONTEXT

Liberia is a tropical country with an average annual rainfall of 4,320 mm, and has a significant agricultural sector, with over 40% of its land area designated for agriculture. Over 70% of the labor force is engaged in agriculture through subsistence farming, contributing 30-40% to the country's gross domestic product (GDP). Despite the 2024 inauguration (the second democratic and peaceful transition of power in 79 years), Liberia's GDP is projected to accelerate by 5.6%, the strongest growth since 2015. This growth is driven by recovering private consumption, lower inflation, greater currency stability, and stronger net agriculture exports (achievable only by doubling inputs, including Agro and technical capacities to exponentially increase current national agricultural outputs envelope).

In 2022 also, the economy expanded by 4.8% due to the mining sector's performance and favorable agricultural harvests. The Liberian agricultural sector exhibited resilience and grew by 5.9%, despite global headwinds (including the Russian-Ukraine war). Liberia continues to grapple with fragility, particularly evident in food security and malnutrition, as highlighted by the persistently high prevalence of undernourishment among its population, reaching a concerning rate of 38.4% between 2020 and 2022. This alarming figure translates to roughly two million individuals out of the country's total population of over five million suffering from undernourishment. Moreover, the national poverty headcount in Liberia stands at 50.9%, with rural areas bearing the brunt with a staggering rate of over 70%, while the urban population is comparatively lower at 31.5%. This disparity disproportionately affects rural residents, with 50.9% of the 39% national food insecurity rate being rural inhabitants compared to their urban counterparts at 28.1%.

Liberia's population rose to 5.2 million in 2023 with a global Human Development Index rank of 178 out of 189, indicating significant development challenges and the population growth rate stands at 3% per annum. The labor market has seen some improvements, but the rural-to-urban migration has led to a significant reduction in the agriculture workforce. Despite 75% of the country's population being under the age of 35¹², they prefer other livelihood opportunities, such as artisanal mining and commercial motorcycle/tricycle riding, which further exacerbates existing social and economic pressures.

To address structural issues and create employment opportunities in the different agriculture value chains, sustained efforts are needed to attract the growing youth population and enhance food nutrition. Major crops including rice, cassava, vegetables, cocoa, coffee, rubber, and oil palm have been niche over the last decades. Fruit crops like papaya, avocado, citrus, mango, grapes, coconuts, bananas, and lime are high in nutritional value, help in beautification, and windbreak (necessary for climate change mitigation) have rarely been prioritized nationally, limiting household food access and local industrial expansion.

¹² <https://liberia.unfpa.org/en/topics/adolescents-and-youth-4>

Over the years, the Liberian governments have through different frameworks and policies (AfT, LASIP I & II, NRDS, and PAPD) and strengthened institutions LACRA, LNSL, CARI, NaFAA, etc.) to develop the sector and lead Liberia's Rising Vision 2030 (food secured and middle-income country) achievement. However, traditional subsistence farming and post-harvest technologies still hinder national agriculture outputs. This results in low domestic production and value-added products, high food insecurity, and poverty among farming households, despite efforts to develop the sector.

28.2. JUSTIFICATION OF THE FRUIT CROP VALUE CHAIN PROGRAM

The cultivation of fruit crops, such as papaya, avocado, citrus, mango, and bananas, among others, has a longstanding tradition in Liberia though on a small scale. Both urban and rural households have historically cultivated these crops within their yards and communities for various purposes. Amongst them, include food consumption, beautification, shade and wind control. Liberia's tropical climatic conditions have provided an ideal environment for the production of these crops, ensuring their seasonal availability throughout the country year-round. It has an intrinsic connection between Liberia's environment and agricultural practices. The cultivation of these crops has been deeply embedded within local traditions and lifestyles, serving as essential sources of nutrition, livelihoods, and cultural significance for communities across the country

Liberia's farmers aside from the nation's staple food crops production, primarily engaged in rubber, oil palm, cocoa, and coffee farming, are challenged with price fluctuation and other global demands. The need for income diversification is on the increase, especially since national production is mostly organic farming. Papaya, avocado, citrus, mango and bananas hold great potential to diversify the cash crops dominated agricultural sector in Liberia, while lavishing their high nutritional value and potential to improve both urban and local rural communities' diets, especially for women and children. In 2022, the US Department of Commerce through its International Trade Authority reported the availability of market opportunities and potential for agribusiness and value chain investments are also present for vegetables, fruit, poultry, and fish in Liberia.

Liberia's membership in the United Nations and other international institutions demonstrates her commitment to global initiatives aimed at addressing food security and nutrition. The 2021 International Year of Fruits and Vegetables (IYFV) and other broader frameworks such as the UN Decade of Action on Nutrition (UNDAN 2016-2025) and the UN Decade of Family Farming (UNDF 2019-2028) align with fruit crop value chain development. This will promote sustainable agricultural practices, dietary diversity and raise awareness about food security and nutrition. These efforts are capable of reducing the sector's underdevelopment, increasing productivity through crop value chain diversification, and addressing constraints such as limited agricultural research, extension services, access to inputs, post-harvest losses, financing, and infrastructure.

The Government of Liberia has also committed to fully implementing all agriculture sectorial policies and addressing the constraints in the agriculture sector so that Liberians can produce more to feed themselves, generate sufficient income and improve the livelihood of their families and communities. This is an overarching objective of the government of Liberia's national development agenda known

as the ARREST. These ambitious targets are also outlined in the global initiatives such as the UN DAN 2016-2025 and the UN SGs 2030

Like vegetables, fruits contribute to human and planetary health. Despite an overall increase in global fruit and vegetable production between 1968 and 2017, the availability of these crops remains insufficient to meet recommended consumption levels. Liberia for example has significantly dropped average fruit consumption per person from more than 60kg in 1961 to less than 40kg in 2021 (Figure 1). The Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) recommend a minimum daily consumption of at least 400 grams of fruits and vegetables per person¹³. The current fruit production levels of Liberia fell short at 205,631 tonnes in 2020 and ranks 125th of 180 producing countries, which is posing a challenge to achieving national nutrition and health goals.

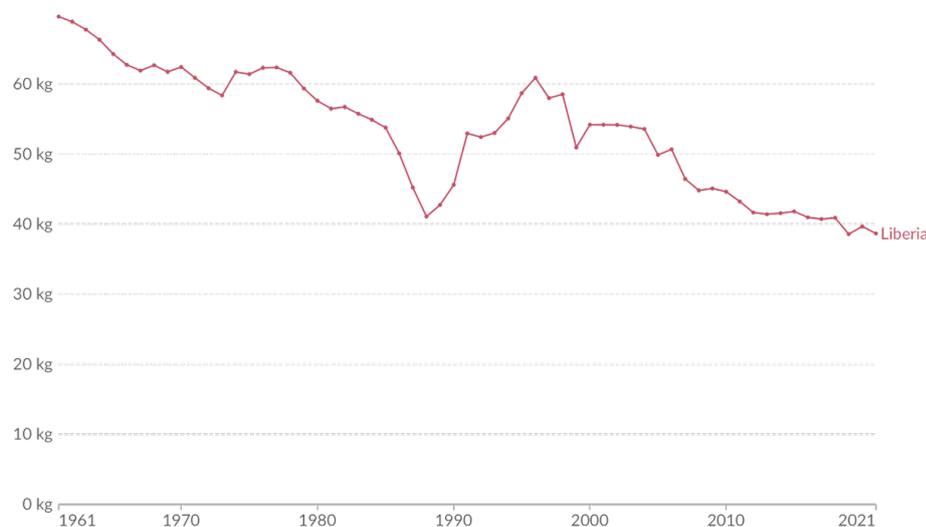


Figure 3: Average Fruit consumption per capita in Liberia, 1961 to 2021

The majority of fruit and vegetables produced in Liberia are consumed domestically to surge national households' hunger and food insecurity. Due to a lack of prioritization of fruit crop cultivation since the end of the war, Liberia's fruit production and cultivated area have remained stagnant over the past two decades. However, the combined productivity in 2021 alone amounted to nearly 276 thousand tons.

In Liberia, fruit production is plagued by post-harvest loss, including limited value addition technical know-how and limited national interest since the end of the war. Beyond the direct economic implications, these losses also underscore the inefficiency in land resources and agricultural inputs utilized to produce and enhance agricultural production and productivity. Therefore, addressing inefficiencies and increasing the domestic supplies within the fruit crop value chain is crucial not only

¹³ Santacoloma et al., 2021

for reducing food loss and waste but also for enhancing economic prosperity, employment generation, and sustainable land use practices within the agriculture sector.

Understanding the trends and obstacles within fruit value chains across different levels—macro, meso, and micro—is vital for devising a comprehensive development strategy. The complexity of challenges within these systems underscores the importance of focused attention and concentration to formulate a holistic plan. Attempting to address the intricacies of the fruit crop sub-sector solely through a singular model is impractical, if not unfeasible, given the substantial losses and waste experienced. Therefore, a multifaceted approach that considers various levels of the value chain is essential for effective system-wide planning and improvement.

The volume of the fresh fruits market is expected to reach 303.70 billion kilograms by 2028. Specifically, the market is projected to exhibit a volume growth of 4.0% in 2025. These indicate significant opportunities within the fruit value chain for investment that Liberia can capitalize on to increase domestic fruit supplies at affordable prices strategically targeting the growing global demand for fresh fruits and contributing to the sustainable growth of the fruit industry. However, the fruit crops’ extreme perishability and sensitivity to transportation remain a major barrier to a large development in international trade, making produce relatively unfit for supply to distant locations. Advancements in cold chain, packaging, and transportation technology hold the potential to enable a wider consumer demand for tropical fruits in the importation of citrus, papaya, avocado, mango, and coconuts especially considering the expanding markets.

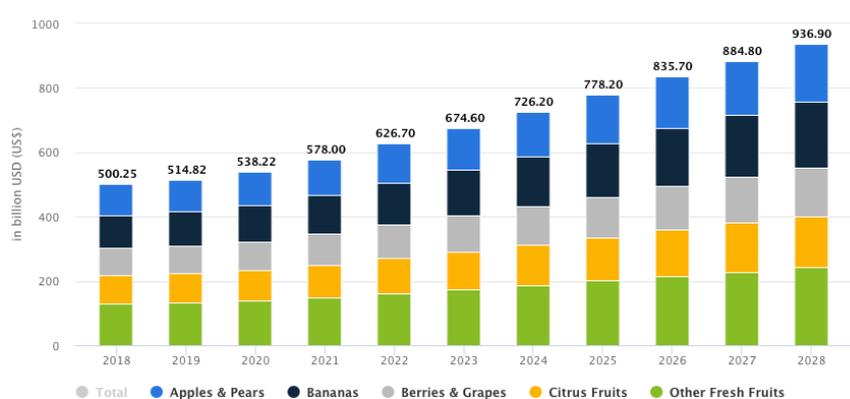


Figure 4: Global Revenue and Projection for Fruit Crops 2018-2028 (Statista Market Insights, March, 2024)

28.3. THE THEORY OF CHANGE OF THE FRUIT CROP VALUE CHAIN PROGRAMS

Almost all economic and sub-sectorial assessments of Liberia's economic performance agree that agriculture is the primary sector supporting the livelihoods of most of its population. However, due to low production and productivity in all commodities except tree crops, Liberia relies heavily on food imports, including fruits and its related products like juice. This dependence on imports exposes Liberians to food price volatility, contributing to structural economic imbalances and vulnerability.

Recognizing these challenges, national development policies have over the years and continued to prioritize agricultural production and productivity to achieve Liberia's Vision 2030 and the UN SDGs.

The Theory of Change for fruit crop value chain development, aligned with the ARREST and agriculture agenda, aims to explore fruit cultivation as a means to increase and diversify agricultural outputs. This approach seeks to achieve sustainable food security, job creation, and sound natural resources management, with a focus on increasing domestic supplies of papaya, mangoes, avocados and citrus, particularly for vulnerable households. Liberians heavily rely on purchasing food, making them susceptible to fluctuations in food prices. Besides rice, the country's primary staple, which accounts for about two-thirds of national consumption and is largely imported, there has been a notable increase in fruit and vegetable imports. From 1973 onwards, these imports have grown steadily at an average annual rate of 13.05%, reaching 21,125.6 metric tons.

Liberia, being a tropical country, has a history of cultivating fruit crops (including papaya, mangoes, avocados, citrus and coconuts), in rural and urban areas. However, since the war, national priorities shifted towards food and tree crops only, leaving the local fruit market reliant on imports from neighboring countries. Rural-to-urban migration has depleted farming manpower, exacerbating poverty rates in rural areas and increasing challenges have also been posed due to poor infrastructure and agriculture post-harvest handling.

The fruit crop value chain development agenda aims to leverage Liberia's comparative advantages in cultivating papaya, mangoes, avocados, citrus and coconuts. By enhancing the technical capacity of local farmers, agriculture experts, and research institutions, the initiative seeks to increase national production, contribute to GDP and economic growth, and generate job opportunities. Ultimately, this approach aligns with Liberia's Vision 2030 objectives, the ARREST, the UN SDGs, and global initiatives on nutrition and family farming.

Table 65: Summary Theory of Change for FC VC

| Main issues | Transformation or change to achieve | Expected results | Main agents of transformation or change | Driving assumptions | Impacts and links with Government global policies |
|--------------|---|---|---|---|--|
| High imports | <ul style="list-style-type: none"> i. Integrate fruit crop cultivation in the national agroforestry scheme ii. Promote fruit crop trees planting for city beautification and climate change mitigation iii. Promote access to quality planting | <ul style="list-style-type: none"> a. More Liberians, including farmers and urban settlers growing fruit crops b. Production area increased c. Fruit crops prices on the local markets dropped | Farmers, Ministry of Agriculture, Central Agricultural Research Institute, City Governments, Ministry of Public Works | Increase Agriculture budget and political will for agriculture development and fund raising for agriculture expansion, political will for environmental sustainabilit, participation of | ARREST, Liberia National Climate Adaptation Plan 20200-2030, UN SGs #1, 8, 9, Global Disaster Risk Reduction Framework 2015-2030, CAADP & FARA R&D |

| | | | | | |
|---|--|---|---|--|--|
| | materials and other Agro inputs | d. Fruits in the daily meals of more Liberians particular, the vulnerable and marginalized women, children and youth gradually included | | stakeholders in sustainable practices, commitment to reducing malnutrition | |
| Migration of labor away from fruits production | <ul style="list-style-type: none"> i. Develop infrastructure and technologies to contribute to fruit crop production ii. Develop fruit crop investment climate to attract large scale farm investment | <ul style="list-style-type: none"> a. Unemployment dropped | Farmers, Ministry of Agriculture, Central Agricultural Research Institute, Private Sectors, Partners | Enhance agriculture development through improved infrastructure, commitment to drop high-rate unemployment alleviation, enhance investment climate | ARREST, AU Agenda 2064, UN SDGs goals, ECOWAP |
| Low research on fruits value chains (seed, planting, shelf life, processing, etc) | <ul style="list-style-type: none"> i. Invest in fruit crops research (from production to processing) ii. Encourage agriculture universities, extension system and colleges to prioritize fruit crops research iii. Promote students using national fruit crop research facilities and infrastructure free of charge | <ul style="list-style-type: none"> a. Production and cultivation length reduced b. Shorten extension delivery c. Farmers access to new technologies and innovation increased d. | Central Agricultural Research Institute, Both public and private Agriculture Colleges and Universities, MOA DRDRE, Private Sectors | CARI Strategic Plan 2023-2030 in full swing, two-third of annual agriculture colleges research on fruit crops, technical back stopping to farmers, researchers at CARI skill enhanced and capacity developed | ARREST, Liberia National Climate Adaptation Plan 2020-2030, UN SGs, CAADP & FARA R&D |
| Lack of improve seeds | <ul style="list-style-type: none"> i. Develop high yielding or superior varieties and modern technologies | <ul style="list-style-type: none"> a. New varieties developed b. Production increased | Central Agricultural Research Institute, Liberia Agriculture Commodity Regulatory Agency, Cooperative Development Agency, Private Sectors, Partners | <p>Political will for agricultural development.</p> <p>-Commitment of technical and financial partners.</p> <p>-Involvement of young people and women</p> | ARREST, Liberia National Climate Adaptation Plan 2020-2030, UN SGs, CAADP & FARA R&D |

FC: Fruit Crops; VC: Value Chain; UN: United Nations; R&D: Research and Development; CAADP: Comprehensive Agriculture Agenda Development Program; FARA: ECOWAP:

If farmers prioritize the cultivation of fruit crops such as papaya, mangoes, avocados, citrus and coconuts it will create a window of opportunity for the agriculture sector to enhance national food security, improve nutrition, and expand employment opportunities. This will happen if the national government facilitates an enabling environment by providing subsidies, access to finance, and land for production and services to a variety of producers, thereby increasing productivity in the fruit crop value chain and establishing market linkages.

Additionally, if more Liberians, especially vulnerable and marginalized individuals like women, children, and youth, incorporate fruits into their daily diet, it will lead to improved health and reduced fruit prices in local markets. By promoting the adoption of fruit crops in national agroforestry programs and encouraging their planting for beautification and climate change mitigation, the government can further enhance fruit crop production.

Investing in agricultural research, including research on fruit crops, and providing extension services to farmers across the country will also be essential. Consequently, more Liberians, including large-scale farmers, will be motivated to invest in the cultivation of papaya, mangoes, avocados, citrus and coconuts thereby contributing to economic livelihoods and creating rural and urban employment opportunities.

This intervention will stimulate fruit production and productivity, leading to increased availability, accessibility, affordability, and timely utilization of various papaya, mangoes, avocados, citrus and coconuts products in communities and marketplaces, ultimately boosting government foreign exchange returns and reducing the existing production-consumption gap caused by importation.

28.4. THE DEVELOPMENT OBJECTIVE OF THE FRUIT CROP VALUE CHAIN PROGRAMS

The government of Liberia's agricultural development strategy, as stated in Rising Vision 2030 and other policy papers, is to create a market-oriented agricultural sector to reduce poverty, create jobs, ensure food and nutrition security, and increase revenue. The overall objective of developing the fruit crops value chain (papaya, avocado, citrus, mango and bananas), is to increase Liberia's domestic fruit crops supply to improve nutritional profile, boost economic growth, and increase food security that will enable Liberia to achieve Rising Vision 2030. Besides, the fruit crop value chain programs will ensure gender and youth issues are mainstreamed and focused in all of its implementation formulation, planning, programming and proposed interventions at national, regional, county and districts levels.

Table 66: Selected Commodities of the FCVC Production Priorities

| Commodities | Production Priorities |
|-------------|---|
| Papaya | <ul style="list-style-type: none"> - Food Security: papaya cultivation will be facilitated to enhance domestic papaya supply that will ensure consistent availability, diversification of food supply, reduce import dependency, and mitigate market fluctuations, enhancing food security |

| | |
|---------|--|
| | <ul style="list-style-type: none"> - Nutritional outcomes through the promotion that will increase consumption of domestically produced papaya and its products to improve dietary diversity, reduce malnutrition, and improve public health |
| Avocado | <ul style="list-style-type: none"> - Food security: increased domestic avocado supplies will ensure consistent availability, diversify food supply, reduce import dependency, and mitigate market fluctuations, enhancing food security - Nutritional outcomes: Promoting increased consumption of domestically produced avocado and its products can improve dietary diversity, reduce malnutrition, and improve public health and balanced diet - Economic Growth: Increased domestic production of avocados will create market needed of its products made through value addition, which will stimulate economic activity, reduce local market prices, increase national product and exportation of raw materials, create employment opportunities, support rural livelihoods, and contribute to overall economic growth |
| Citrus | <ul style="list-style-type: none"> - Food security: Increased domestic citrus supplies will ensure consistent availability, diversify food supply, reduce import dependency, and mitigate market fluctuations, enhancing food security - Nutritional outcomes: Promoting increased consumption of domestically produced citrus and its products can improve dietary diversity, reduce malnutrition, and improve public health - Economic Growth: Increased domestic production of citrus will stimulate economic activity, reduce local market prices, increase national product, increase raw materials exportation, create employment opportunities, support rural livelihoods, and contribute to overall economic growth |
| Mango | <ul style="list-style-type: none"> - Food security: Increased domestic mango supplies will ensure consistent availability, diversify food supply, reduce import dependency, and mitigate market fluctuations, enhancing food security - Nutritional outcomes: Promoting increased consumption of domestically produced mango and its products can improve dietary diversity, reduce malnutrition, and improve public health - Economic Growth: Increased domestic production of mango will stimulate economic activity, reduce local market prices, increase national product, create employment opportunities, support rural livelihoods, and contribute to overall economic growth |
| Bananas | <ul style="list-style-type: none"> - Food security: Increased domestic bananas supplies will ensure consistent availability, diversify food supply, reduce import |

| | |
|--|--|
| | <p>dependency, and mitigate market fluctuations, enhancing food security</p> <ul style="list-style-type: none"> - Nutritional outcomes: Promoting increased consumption of domestically produced bananas and its products can improve dietary diversity, reduce malnutrition, and improve public health - Economic Growth: Increased domestic production of bananas will stimulate economic activity, reduce local market prices, increase national product, create employment opportunities, support rural livelihoods, and contribute to overall economic growth |
|--|--|

FCVC: Fruit Crops Value Chain

XXIX. PAPAYA VALUE CHAIN DEVELOPMENT PROGRAM

29.1. EXPECTED OUTPUTS

- 1,000 ha of improved papaya plantation established through support for smallholder farmers
- Institutional capacity of interested private-sector actors strengthened in major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings
- Development of local papaya trade facilitated to create off-taker opportunities for producers
- Access to postharvest management facilities and technology improved to reduce postharvest loss

29.2. KEY STRATEGIC INTERVENTIONS

29.2.1. Enhancing Production and Increasing Production Areas of Papaya Orchard

Papaya, commonly known as Pawpaw to Liberians, are mainly cultivated as a backyard garden fruit, complementing food security and serving as flowers for community and environmental beautification. This practice has over years has not been improving to increase national product and cultivated areas in the past two decades and even before the war. This component aim is to increase cultivated areas and overall production, which will increase the food security complementary and diversified households' sources of income and facilitate job opportunities for both rural and urban communities.

Given its long history, MOA with its many partners will augment and reinforce this practice by: (i) facilitating the distribution of superior and dwarf papaya varieties to smallholder farmers around Liberia, (ii) promoting papaya as part of the selected crops for cultivation in the recently launched periurban agriculture program, meant to attract youth and urban residents to join in agriculture cultivation as in backyard garden strategies, (iii) encouraging local communities to grow papaya in their yard and communities.

Due to the growing climate change, Liberia's seasonal weather, which is conducive for both temperate and tropical fruit production, including papaya, will be assessed for new climate profiles and identify non-forest lands suitable for developing new and large papaya orchards.

Feasibility studies for commercial and mechanized farming of papaya crops will be conducted, and efforts will be made to attract large orchard investors for papaya production within the value chain, with a target of at least 1,000 hectares of land.

Additionally, the MoA will promote agroforestry and intercropping practices to maximize land use and increase productivity. For instance, papaya will be included in the promotion for cultivation as shade for cocoa and coffee crops across the country depending on soil classification. Ministry of Agriculture (MOA), Environmental Protection Agency (EPA), and Forest Development Authority (FDA) will lead this cause. Also, with the national development of national parks around the country, papaya will be

promoted to form part of the flowers for beautification. MOA will collaborate with relevant government agencies, including city governments, to facilitate this initiative and encourage papaya as tree flowers.

To sustain the continued supply of superior papaya varieties, CARI will be capacitated to develop research initiatives that harness the sustainable development of papaya. Also, CARI with facilitation from MOA will develop a papaya seed garden and distribution within all five agriculture regions.

The MoA will support the institutional capacity development of interested private-sector actors to strengthen in papaya production in the counties to establish nurseries for the production and supply of improved hybrid seeds. Besides, an assessment will be conducted to develop a national papaya belt for Liberia.

29.2.2. Enhancing Post-Harvest Handling and Access to Market

In Liberia, papayas are mostly forced to ripe prematurely causing significant loss of taste due to inadequate harvest techniques, poor value addition techniques and infrastructure. The main steps to enhance post-harvest handling of avocados are:

- Proper Harvesting: Harvest papaya at the right maturity stage, typically when the fruit reaches the desired size and changes color. Avoid picking papayas prematurely or late, as this can impact quality and shelf life. MOA will encourage papayas intercropping with other crops with short cultivation so that farmers and producers can allow papayas to reach its maturity stage.
- Handling Practices: Handle papayas with care to minimize bruising and damage during harvesting, transport, and storage. MOA will support farmers to use appropriate tools and techniques to avoid physical injuries to the fruit.
- Storage Conditions: MOA with its partners will promote papayas harvest techniques that include ventilation and cool storage areas to prolong their shelf life.
- Quality Sorting: MOA along with relevant government agencies will develop quality sorting and synchronize strategies for papayas. LACRA and NSL will implement quality control measures to ensure that only high-quality papayas are distributed to markets.
- Market Access and Distribution: NIC, MOA and other relevant agencies will encourage or attract papayas value addition base company to venture into the Liberian market for raw materials.

29.3. BUDGET FOR PAPAYA VALUE CHAIN DEVELOPMENT

Table 67: Projected Estimates for Investment in Papaya VC

| Components/Activities | Timeline | | | | | | Total Cost in US\$ |
|--|----------|---------|--------|------|------|------|--------------------|
| | Yr-1 | Yr-2 | Yr-3 | Yr-4 | Yr-5 | Yr-6 | |
| Component 1: Enhancing Production and Increasing Production Areas | | | | | | | |
| 1.1. Facilitating the distribution of superior and dwarf papaya varieties to households around Liberia | 500,00 | 150,000 | 25,000 | | | | 225,000 |

| | | | | | | | |
|--|---------|---------|-----------|-----------|-----------|---------|-------------------|
| 1.2. Integrating papaya production in the national periurban agriculture program to attract youth and urban residents to join in agriculture cultivation as in back yard garden strategies | 100,00 | 10,000 | 10,000 | 10,000 | 10,000 | 50,000 | 100,000 |
| 1.3. Conducting assessment for new climate profiles and identify non-forest lands suitable for developing new and large papaya orchards | | 35,000 | | | | | 35,000 |
| 1.4. Attracting large orchard investors for avocado production within the value chain | | 150,000 | 400,000 | 550,000 | 70,000 | | 1,170,000 |
| 1.5. Promoting papaya in the agroforestry and intercropping practices to maximize land use and increase productivity | 100,000 | 200,000 | 350,000 | 500,000 | 500,000 | 20,000 | 1,670,000 |
| 1.6. Developing papaya seed garden and different seedling distributions within all five agriculture regions | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 300,000 |
| 1.7. Facilitate the development of new papaya farm of 1,000 ha | | 650,000 | 1,462,500 | 2,275,000 | 1,300,000 | 812,500 | 6,500,000 |
| Sub total | | | | | | | 10,000,000 |
| Component 2: Enhancing Post-Harvest Handling and Access to Market | | | | | | | |
| 2.1. Capacity building on post-harvest handling and harvest techniques | 75,000 | 150,000 | 175,000 | 50,000 | 30,000 | 20,000 | 500,000 |
| 2.2. Promotion of value addition techniques | | 100,000 | 250,000 | 197,800 | 100,000 | 50,000 | 697,800 |
| 2.3. Development of infrastructure for post-harvest handling and quality for the market | | 530,000 | 1,700,000 | 2,000,000 | 1,511,000 | 951,200 | 6,692,200 |
| Sub total | | | | | | | 7,890,000 |
| Grand Total | | | | | | | 17,890,000 |

Yr: Year; USD: United States Dollars

XXX. AVOCADO VALUE CHAIN DEVELOPMENT PROGRAM

30.1. EXPECTED OUTPUTS

- Developed 5,000 ha of avocado plantation for smallholders and large-scale farmers
- Strengthened Institutional capacity of interested private-sector actors strengthened major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings
- Development of local avocado trade facilitated to create off-taker opportunities for producers
- Access to postharvest management facilities and technology improved to reduce postharvest loss

30.2. KEY STRATEGIC INTERVENTIONS

30.2.1. Enhancing Production and Increasing Productivity Areas of Avocado Orchard

Avocados, commonly known as Butter Pear in Liberia, just like papayas are mainly cultivated as a backyard garden fruit, complementing food security and providing shade for residents. This practice has kept the national cultivated areas and overall production stagnant over the past two decades. Nonetheless, this component aims to increase production and cultivation areas as a means of diversifying households and farmers' sources of income and facilitating opportunities for rural communities, including women and youth.

Given Liberia's seasonal weather, which is conducive for both temperate and tropical fruit production, including avocado, the Ministry of Agriculture (MOA), Environmental Protection Agency (EPA), and Forest Development Authority (FDA) will assess the new climate profile and identify non-forest lands suitable for developing new orchards for avocado.

To sustain the continued supply of superior avocado varieties, CARI will be capacitated to develop research initiatives that harness the sustainable development of avocado. Also, CARI with facilitation from MOA will develop avocado seed gardens and distribution within all five agriculture regions.

The MoA will support institutional capacity development of interested private-sector actors strengthened in avocado production counties to establish nurseries for the production and supply of improved hybrid seeds

Feasibility studies for commercial and mechanized farming of avocado crops will be conducted, and efforts will be made to attract large orchard investors for avocado production within the value chain, with a target of at least 4,000 hectares of land.

Additionally, this component will promote agroforestry and intercropping practices to maximize land use and increase productivity. For instance, avocados will be promoted for cultivation as shade for cocoa and coffee crops across the country depending on soil classification. As part of climate change

mitigation, city beautification, and ecosystem resilience enhancement in both rural and urban areas, the cultivation of avocado trees will be promoted. MOA will collaborate with relevant government agencies, including city governments, to facilitate this initiative and encourage every citizen to plant at least five avocado trees in their yard.

30.2.2. Enhancing Post-Harvest Handling and Access to Market

Similar to papayas in Liberia, avocados are mostly forced to ripe prematurely causing significant loss of taste due to inadequate harvest techniques, poor value addition techniques and infrastructure. The main steps to enhance post-harvest handling of avocados with women and youth as focus are:

- Proper Harvesting: Harvest avocados at the right maturity stage, typically when the fruit reaches the desired size and changes color. Avoid picking avocados prematurely or late, as this can impact quality and shelf life. MOA will encourage avocados intercropped with other crops with short cultivation so that farmers and producers can allow avocado to reach its maturity stage.
- Handling Practices: Handle avocados with care to minimize bruising and damage during harvesting, transport, and storage. MOA will support farmers to use appropriate tools and techniques to avoid physical injuries to the fruit.
- Storage Conditions: MOA with its partners will promote avocado harvest techniques that include ventilation and cool storage areas to prolong their shelf life.
- Quality Sorting: MOA along with relevant government agencies will develop quality sorting and synchronize strategies for avocados. LACRA and NSL will implement quality control measures to ensure only high-quality avocados are distributed to markets.
- Market Access and Distribution: NIC, MOA and other relevant agencies will encourage or attract avocados value addition base companies to venture into the Liberian market for raw materials.

30.3. BUDGET FOR AVOCADO VALUE CHAIN DEVELOPMENT

Table 68: Projected Estimates for Investment Avocado VC

| Components/Activities | Timeline | | | | | | Total Cost in US\$ |
|---|-----------|---------|-----------|-----------|-----------|-----------|--------------------|
| | Yr-1 | Yr-2 | Yr-3 | Yr-4 | Yr-5 | Yr-6 | |
| Component 1: Enhancing Production and Increasing Productivity Areas of Avocado Orchard | | | | | | | |
| 1.1. Facilitate the development of new avocado farm of 4,000 ha | 2,000,000 | 400,000 | 4,000,000 | 4,000,000 | 4,000,000 | 2,000,000 | 16,400,000 |
| 1.2. Conduct assessment for new climate profiles and identify non-forest lands suitable for developing new and large avocado orchards | | 35,000 | | | | | 35,000 |
| 1.3. Attract large orchard investors for avocado | | 150,000 | 400,000 | 550,000 | 70,000 | | 1,170,000 |

| | | | | | | | |
|---|---------|---------|-----------|-----------|-----------|---------|-------------------|
| production within the value chain | | | | | | | |
| 1.4. Promoting avocado in the agroforestry and intercropping practices to maximize land use and increase productivity | 100,000 | 200,000 | 350,000 | 500,000 | 500,000 | 20,000 | 1670,000 |
| 1.5. Developing avocado seed garden and different seedling distributions within all five agriculture regions | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 300,000 |
| Sub total | | | | | | | 19,575,000 |
| Component 2: Enhancing Post-Harvest Handling and Access to Market | | | | | | | |
| 2.1. Capacity building on post harvest handling and harvest techniques | 75,000 | 150,000 | 175,000 | 50,000 | 30,000 | 20,000 | 500,000 |
| 2.2. Promotion of value addition techniques | | 100,000 | 250,000 | 197,800 | 100,000 | 50,000 | 697,800 |
| 2.3. Development of infrastructure for post harvest handling and quality for the market | | 530,000 | 1,700,000 | 1,671,600 | 1,355,300 | 639,800 | 5,896,700 |
| Sub total | | | | | | | 7,094,500 |
| Grand Total | | | | | | | 26,669,500 |

Yr: Year; USD: United States Dollars

XXXI. MANGO VALUE CHAIN DEVELOPMENT PROGRAM

31.1. EXPECTED OUTPUTS

- 1,000 ha of improved mango plantation established through support for smallholder farmers
- Institutional capacity of interested private-sector actors strengthened major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings
- Development of local mango trade facilitated to create off-taker opportunities for producers
- Access to postharvest management facilities and technology improved to reduce postharvest loss

31.2. KEY STRATEGIC INTERVENTIONS

31.2.1. Revitalization and Production Enhancement of Mangoes

The interventions aim to revitalize the production capacity of mango plantations that are old and were abandoned due to the civil war, while also enhancing the quantity, quality and post-harvest loss of mango. It will also promote the cultivation of new mango plantations amongst smallholder farmers, including women and youth. Under this initiative, the Ministry of Agriculture will facilitate the cultivation of 1,000 hectares of mango plantations across Liberia including the attraction of large-scale farming.

MOA facilitates the identification of areas needing rehabilitation, revitalization and replacement of mango trees in a similar vein.

Moreover, MOA will lead a mobilization of essential equipment and simple mechanized tools to assist smallholder farmers, making them accessible at minimal costs.

Regular technical assistance and training will also be provided to farmers, focusing on best practices for mango plantation management, including appropriate planting methods, irrigation, fertilization, and the selection of suitable germplasm to enhance the development quality of produce.

Using new technologies typically involves stages such as adoption, adaptation, expansion, and integration. Given that mango crops are long-term and inherently risky ventures, the training of farmers will also require a significant amount of time. Therefore, social mobilization efforts will be undertaken by MOA and its partners to prepare people for engaging in mango plantation activities. This will include the promotion of improved mango planting materials or seedling development farmers to plant high-quality local mango varieties that have good market demand to create off-taker opportunities for producers.

31.2.2. Enhancing Post-Harvest Handling and Access to Market

The interventions will enhance service post-harvest and market access provision to mango farmers and other actors within its value chain program, thereby fostering sectoral development. Liberia continues to experience significant post-harvest losses due to inadequate post-harvest techniques, packaging, and post-harvest infrastructure. However, the need to develop proper harvesting methods, techniques and storage facilities cannot be overemphasized.

Under this component also, the Ministry of Agriculture (MOA), in collaboration with national and international partners, will facilitate the strengthening and technical capacity of smallholder farmers, including women and youth across all five agricultural regions to venture into simple mango value-addition, including natural mango juice production. Also, the MOA will promote and facilitate the local fabrication of tools or equipment that farmers or community dwellers can use to change mango produce into value-added products.

Also, the government of Liberia through the National Investment Commission, MOA and relevant agencies will attract large mango product base developers to venture into the Liberian market. The aim is to use Liberia as a source of mango product raw materials, which will reduce post-harvest losses and support the growth of the local economy.

31.3. BUDGET FOR MANGO VALUE CHAIN DEVELOPMENT PROGRAM

Table 69: Estimates for 5 Years of Mango Value Chain

| Components/Activities | Timeline | | | | | | Total Cost in US\$ |
|---|----------|---------|---------|---------|---------|---------|--------------------|
| | Yr-1 | Yr-2 | Yr-3 | Yr-4 | Yr-5 | Yr-6 | |
| Component 1: Revitalization and Production Enhancement | | | | | | | |
| 1.1. Facilitate the revitalization of old and abandoned mango trees or plantations | 50,000 | 150,000 | 225,000 | 75,000 | 25,000 | | 525,000 |
| 1.2. Promote and facilitate the cultivation of new mango plantations amongst smallholder farmers of 1,000 ha | 300,000 | 750,000 | 975,000 | 600,000 | 150,000 | 150,000 | 2,925,000 |
| 1.3. Facilitate the mobilization of essential equipment and simple mechanized tools to assist smallholder farmers | | 500,000 | 250,000 | 250,000 | | | 1,000,000 |
| 1.4. Attract large orchard investors for avocado production within the value chain | | 150,000 | 400,000 | 550,000 | 70,000 | | 1,170,000 |
| 1.5. Promote mango in the reforestation and climated adaptation program | 100,000 | 200,000 | 350,000 | 500,000 | 500,000 | 20,000 | 1,670,000 |

| | | | | | | | |
|---|---------|---------|-----------|-----------|-----------|---------|-------------------|
| 1.6. Develop mango nurseries and seedling distributions within all five agriculture regions | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 | 180,000 |
| 1.7. Promote and facilitate training and technical backstopping on Mango GAP | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 | 120,000 |
| Sub total | | | | | | | 7,590,000 |
| Component 2: Enhancing Post-Harvest Handling and Access to Market | | | | | | | |
| 2.1. Capacity building on post harvest handling and harvest techniques | 75,000 | 150,000 | 175,000 | 50,000 | 30,000 | 20,000 | 500,000 |
| 2.2. Promote and facilitate the local fabrication of tools or equipment needed for value addition and postharvest handling | | 100,000 | 250,000 | 197,800 | 100,000 | 50,000 | 697,800 |
| 2.3. Development of infrastructure for post harvest handling and quality for the market | | 530,000 | 1,700,000 | 2,000,000 | 1,511,000 | 951,200 | 6,692,200 |
| 2.4. Strengthen Smallholder capacity post harvest and value addition | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 | 1,500,000 |
| 2.5. Attract large mango product base developers to venture in the Liberian market or facilitate Liberian entrepreneur in large mango-based product | 265,000 | 265,000 | 265,000 | 265,000 | 265,000 | 265,000 | 1,590,000 |
| Sub total | | | | | | | 10,980,000 |
| Grand Total | | | | | | | 18,570,000 |

Yr: Year; USD: United States Dollars

XXXII. CITRUS VALUE CHAIN DEVELOPMENT PROGRAM

32.1. EXPECTED OUTPUTS

- 5,000 ha plantation of smallholder farmers established for the production of improved citrus varieties
- Institutional capacity of interested private-sector actors strengthened major production counties to establish nurseries for the production and supply of improved hybrid seeds and seedlings
- Development of local citrus trade facilitated to creation off-taker opportunities for producers
- Access to postharvest management facilities and technology improved to reduce postharvest loss

32.2. KEY STRATEGIC INTERVENTIONS

32.2.1. Revitalization and Production Enhancement of Citrus

The interventions aims to increase the production of old citrus orchards and the development of new orchards, while also enhancing the quantity, quality and post-harvest loss of fruit crops reducing importation from neighbouring countries and obtaining lower prices on the local markets. This will include ensuring the availability of quality planting materials throughout the year.

The Ministry of Agriculture will evaluate existing citrus orchards in size of a minimum of 0.5 hectares per farm across Liberia to identify areas needing rehabilitation, revitalization and replacement. Through collaboration with the Ministry of Agriculture, CARI, and other partners will support the rehabilitation of citrus orchards encompassing soil improvement, pruning, pest and disease management, and the replacement of aged or diseased trees will be facilitated. This will promote the revitalization of at least 1,000 hectares of citrus across the country.

Furthermore, the Ministry of Agriculture will facilitate through partnership to support CARI in expanding, establishing, and managing a seed garden covering at least two hectares for citrus improvement. This will ensure the availability of improved planting materials for farmers, including women and youth farmers.

Additionally, efforts will be made to mobilize farmers or cooperatives, including women and youth to include citrus in the replanting of forests damaged by rural inhabitants. Moreover, the mobilization of essential equipment and simple mechanized tools to assist smallholder farmers, making them accessible at minimal costs.

Regular technical assistance and training will also be provided to farmers, including women and youth focusing on best practices for citrus orchard management, including appropriate planting methods, irrigation, fertilization, and the selection of suitable germplasm to enhance the quality of produce.

CARI will collaborate with regional and international breeding programs to introduce new genetic materials with desirable traits, fostering knowledge exchange and capacity building within the citrus value chain. This initiative aims to enhance the technical skills and knowledge of the citrus value chain stakeholders involved in orange, grapefruit, tangerine and lime production, processing, and marketing, both locally and internationally, through collaborative efforts and information sharing.

Agroforestry and intercropping practices will be promoted to maximize land use and increase productivity amongst farmers, including women and youth. As part of climate change mitigation, city beautification, ecosystem resilience enhancement along the coast, and biodiversity conservation efforts, the cultivation of citrus will be promoted in both rural and urban areas. MOA will collaborate with relevant government agencies, including city governments, to facilitate this initiative and encourage every citizen to plant at least two citrus trees and five in their yard for urban and rural settlement, respectively. MOA will lead similar efforts to ensure county offices will plant citrus in their respective yards for beautification purposes, depending on soil and area suitability.

Moreover, the development of new farms, including 4,000 hectares for citrus orchards will be encouraged and facilitated amongst smallholder farmers and large-scale farmers across Liberia. This will be made possible because of the significant amount of agricultural land that remains underutilized.

32.2.2. Enhancing Post-Harvest Handling and Access to Market

Post-harvest losses are due to inadequate harvesting techniques, packaging, and post-harvest infrastructure. To address this issue, there is a need to develop proper harvesting methods, post-harvest management practices and storage facilities. However, the focus of this component intervention will enhance post-harvest and market access service provision to citrus farmers (including women and youth) and other actors within the value chain, thereby fostering sectoral development.

Under this component also, the Ministry of Agriculture (MOA) with partners to facilitate the strengthening and/or technical backstopping of farmers or cooperatives (including women and youth) across the five agricultural regions. The aim is to boost production and support the growth of at least five cooperatives into efficient and competitive exporters and attract foreign exporters to consider Liberia as a source of citrus products.

Additionally, efforts will be made to promote the improved infrastructure, facilitate the development of regional cold storage facilities by the Liberia Agriculture and Commodities Regulatory Authority (LACRA), and improve port facilities for the exportation of quality citrus produce. This will encourage local producers to add value to their products and as well attract large citrus product base companies.

Facilitating the collaboration with the National Standards Laboratory and the Liberia Agriculture Commercialization Regulatory Agency will be essential to implementing quality control measures by the MOA. These measures will ensure that exported citrus meet international standards regarding freshness, taste, appearance, and safety. Furthermore, the program will promote the enhancement of MOA presence at regional, county, and district levels to strengthen extension services in citrus production.

To support citrus crop development across Liberia, initiatives will be undertaken to provide working capital, either through the Liberia Agriculture Commercialization Fund or by encouraging local banks to offer loans, grants, and funding opportunities to farmers of all kinds including women and youth.

MOA will collaborate with the Ministries of Health, Gender Protection, and Social Welfare to promote fruit consumption and nutrition education, integrating it into existing programs and initiatives. The national fruits crop value chain steering committee will be established.

32.3. BUDGET FOR CITRUS VALUE CHAIN DEVELOPMENT

Table 70: Projected Estimates for Citrus Value Chain

| Components/Activities | Timeline | | | | | | Total Cost in US\$ |
|---|----------|-----------|-----------|-----------|---------|---------|-----------------------|
| | Yr-1 | Yr-2 | Yr-3 | Yr-4 | Yr-5 | Yr-6 | |
| Component 1: Revitalization and Production Enhancement | | | | | | | |
| 1.1. Facilitate the revitalization of old and abandoned citrus trees or plantations | 50,000 | 150,000 | 225,000 | 75,000 | 25,000 | | 525,000 |
| 1.2. Promote and facilitate the cultivation of new citrus plantations amongst smallholder farmers of 5,000 ha | 750,000 | 1,500,000 | 2,250,000 | 1,500,000 | 750,000 | 600,000 | 7,350,000 |
| 1.3. Facilitate the mobilization of essential equipment and simple mechanized tools to assist smallholder farmers | | 500,000 | 250,000 | 250,000 | | | 1,000,000 |
| 1.4. Attract large orchard investors for avocado production within the value chain | | 150,000 | 400,000 | 550,000 | 70,000 | | 1,170,000 |
| 1.5. Promote citrus in the reforestation and climated adaptation program | 100,000 | 200,000 | 350,000 | 500,000 | 500,000 | 20,000 | 1,670,000 |
| 1.6. Develop citrus nurseries and seedling distributions within all five agriculture regions | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 | 120,000 |
| 1.7. Promote and facilitate training and technical backstopping on citrus GAP | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 | 90,000 |
| Sub total | | | | | | | 11,925,000 |
| Component 2: Enhancing Post-Harvest Handling and Access to Market | | | | | | | |
| 2.1. Capacity building on post harvest handling and harvest techniques | 75,000 | 150,000 | 175,000 | 50,000 | 30,000 | 20,000 | 500,000 |

| | | | | | | | |
|---|---------|---------|-----------|-----------|-----------|---------|-------------------|
| 2.2. Promote and facilitate the local fabrication of tools or equipment needed for value addition and postharvest handling | | 100,000 | 250,000 | 197,800 | 100,000 | 50,000 | 697,800 |
| 2.3. Development of infrastructure for post harvest handling and quality for the market | | 500,000 | 1,485,000 | 2,000,000 | 1,511,000 | 951,200 | 6,447,200 |
| 2.4. Strengthen Smallholder capacity post harvest and value addition | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 | 1,200,000 |
| 2.5. Attract large citrus product base developers to venture in the Liberian market or facilitate Liberian entrepreneur in large citrus based product | 205,000 | 205,000 | 205,000 | 205,000 | 205,000 | 205,000 | 1,230,000 |
| Sub total | | | | | | | 10,075,000 |
| Grand Total | | | | | | | 22,000,000 |

Yr: Year; USD: United States Dollars

XXXIII. BANANAS VALUE CHAIN DEVELOPMENT PROGRAM

33.1. EXPECTED OUTPUTS OF BANANA VALUE CHAIN

- 5,000 ha banana orchard of smallholder or larger scale farmers developed established
- National research banana value strengthened for the production of improved banana varieties and post-harvest and value-addition techniques
- A joint national plantain and banana steering committee established
- Capacity of interested private-sector actors, including smallholder farmers and community members strengthened
- National banana production belt established
- Development of the local banana trade facilitated to creation off-taker opportunities for producers
- Access to postharvest management facilities and technology improved to reduce postharvest loss

33.2. KEY STRATEGIC INTERVENTIONS

33.2.1. Enhance Production, Research and Increase Productivity

The interventions aim to increase banana production and enhance banana research in Liberia. This component will implore initiatives that will expand the existing production areas and facilitate the development of new banana orchards.

Under this initiative, the Ministry of Agriculture will evaluate existing banana orchards or communities mini banans orchards of 10-20 trees across Liberia to beef up production strength and enhance good agriculture practices of owners or smallholder farmers, including women and youth. Also, MOA will encourage and facilitate these owners or smallholder farmers to adopt banana entrepreneurship.

Through collaboration, the Ministry of Agriculture along with partners will facilitate CARI to begin research (molecular and traditional) research to continuously support and provide farmers and other stakeholders with superior planting materials and new agronomical practices for technical capacity building of farmers and stakeholders, including women and youth. CARI will be supported and encouraged to collaborate with other research institutions within the African region, including Uganda to strengthen national banana research.

The development of at least 5,000 hectares of new banana orchards will promoted across Liberia in line with the new climate profile and non-forest lands identified through collaborative efforts of the Ministry of Agriculture (MOA), Environmental Protection Agency (EPA), Forest Development Authority (FDA) and other relevant agencies. This will also promote and facilitate the replacement of more than 1,000 hectares of plantain that will be harvested with bananas across the country through the national agroforestry program under implementation by smallholder cocoa and coffee farmers, including women and youth.

Large-scale farmers, women and youth will be encouraged with reasonable and attractive investment opportunities to venture into banana farming. Also, the MOA, CDA and relevant agencies will promote and facilitate smallholder farmers' collaborations to turn smallholders into large-scale farming within at least three of the five agriculture regions. This will involve developing the national banana belt of Liberia.

Essential equipment and simple mechanized tools will be mobilized to assist smallholder farmers, including women and youth. It will also be facilitated for accessibility at minimal costs. Regular technical assistance and training will also be provided to farmers, including women and youth focusing on best practices for banana orchard management and improvement, including appropriate planting methods, irrigation, fertilization, and the selection of suitable germplasm to enhance the quality of produce.

Using new technologies typically involves stages such as adoption, adaptation, expansion, and integration. Given that banana crops are close to perennial and inherently risky ventures, especially soil-borne disease susceptibility, farmers require a significant regular update of knowledge and a reasonable amount of time to adapt. Therefore, social mobilization efforts will be undertaken to prepare people, including women and youth for engaging in banana plantation activities. This will involve educating them through diverse methods, including media, enhancing their technical skills, organizing them into groups and cooperatives, including women and youth and establishing central business service centers to continuously break the understanding of new technologies.

33.2.2. Enhancing Post-harvest Handling and Market Accessibility

Post-harvest losses attributed to deficient harvesting techniques, packaging, and infrastructure underscore the necessity for implementing improved practices and storage facilities. Over the years in Liberia, bananas facing rot have been added to the recipe of banana and rice bread. However, this component aims to promote interventions that will enhance post-harvest management, promote new value-addition techniques and provide market access services for banana farmers and stakeholders, including women and youth within the value chain, thereby stimulating national economic growth.

Under this initiative, the Ministry of Agriculture (MOA) and its partners will collaborate to strengthen and provide technical assistance to farmers, cooperatives and community dwellers, including women and youth across Liberia's five agricultural regions. The goal is to augment production facilitate the transformation of banana production and improve local value-addition knowledge and skills into efficient entrepreneurship. Also, farmers' cooperatives, including women and youth will be technically backstopped to grow them into competitive exporters, while also encouraging foreign exporters to consider Liberia as a source of quality banana produce.

Additionally, efforts will be directed towards promoting enhanced infrastructure, facilitating the establishment of regional cold storage facilities by the Liberia Agriculture and Commodities Regulatory Authority (LACRA), and improving port facilities for exporting high-quality banana produce. These measures will incentivize local producers (including women and youth) to add value to

their products and attract major banana-based companies. Collaboration with the National Standards Laboratory and the Liberia Agriculture Commercialization Regulatory Agency will be crucial for implementing quality control measures by the MOA. These measures will ensure that exported banana meets international standards in terms of freshness, taste, appearance, and safety. Furthermore, the program will advocate for strengthening MOA's presence at regional, county, and district levels to enhance extension services in banana production.

To foster banana and plantain development nationwide, A joint national plantain and banana steering committee will be established to support : (i) initiatives launched to provide working capital, either through the Liberia Agriculture Commercialization Fund or by encouraging local banks to offer loans, grants, and funding opportunities (ii) promotion of enhanced infrastructure, (iii) social mobilization of farmers, including women and youth (v) coordination with the Ministries of Agriculture, Health, Gender Protection, and Social Welfare to promote banana consumption as part of potassium intake of citizens and nutrition education, integrating these efforts into existing programs and initiatives., (v) establishment of National banana production belt. Additionally, A national plantain steering committee if there is any will be augmented or established to include bananas to oversee these endeavours.

33.3. BUDGET FOR BANANA VALUE CHAIN DEVELOPMENT

Table 71: Projected Estimates for 5 Years Banana Value Chain

| Components/Activities | Timeline | | | | | | Total Cost in US\$ |
|---|-----------|-----------|-----------|-----------|---------|---------|--------------------|
| | Yr-1 | Yr-2 | Yr-3 | Yr-4 | Yr-5 | Yr-6 | |
| Component 1: Production Enhancement, Research and Increase Productivity | | | | | | | |
| 1.1. Facilitate the expansion of orchards community or individual banana trees | 50,000 | 150,000 | 225,000 | 75,000 | 25,000 | 10,000 | 535,000 |
| 1.2. Promote and facilitate the cultivation of new banana plantations amongst smallholder farmers of 5,000 ha | 1,000,000 | 2,000,000 | 4,000,000 | 2,000,000 | 650,000 | 350,000 | 10,000,000 |
| 1.3. Support and provide farmers and other stakeholders with superior planting materials and technical capacity building on bananas GAP | 600,000 | 500,000 | 250,000 | 250,000 | 150,000 | 5,000 | 1,755,000 |
| 1.4. Attract large orchard investors for avocado production within the value chain | | 150,000 | 400,000 | 550,000 | 70,000 | 100,000 | 1,270,000 |
| 1.5. Promote banana in the national agroforestation and climate adaptation program | 100,000 | 200,000 | 350,000 | 500,000 | 500,000 | 20,000 | 1,670,000 |

| | | | | | | | |
|--|---------|---------|-----------|-----------|-----------|-----------|-------------------|
| 1.6. Develop and establish banana genebank for both traditional and advanced improvement | 650,000 | 650,000 | 650,000 | 650,000 | 650,000 | 650,000 | 3,900,000 |
| 1.7. Promote and facilitate banana nurseries and suckers distributions within all five agriculture regions | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 | 180,000 |
| Sub total | | | | | | | 19,310,000 |
| Component 2: Enhancing Post-harvest Handling and Market Accessibility | | | | | | | |
| 2.1. Capacity building on post-harvest handling and harvest techniques | 75,000 | 150,000 | 175,000 | 50,000 | 30,000 | 20,000 | 500,000 |
| 2.2. Promote and facilitate the local fabrication of tools or equipment needed for value addition and postharvest handling | 100,000 | 331,250 | 250,000 | 197,800 | 100,000 | 50,000 | 1,029,050 |
| 2.3. Development of infrastructure for post harvest handling and quality for the market | | 600,000 | 1,785,000 | 2,500,000 | 2,011,000 | 1,051,200 | 7,947,200 |
| 2.4. Strengthen Smallholder capacity post harvest and value addition | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 | 1,200,000 |
| 2.5. Attract large banana product base developers to venture in the Liberian market or facilitate Liberian entrepreneur in lanrge banana-based product | 205,000 | 205,000 | 205,000 | 205,000 | 205,000 | 205,000 | 1,230,000 |
| Sub total | | | | | | | 1,190,6250 |
| Grand Total | | | | | | | 31,216,250 |

Yr: Year; US\$: United States Dollars

33.4. TOTAL BUDGET FOR FRUIT CROP VALUE CHAIN PROGRAM

This is a 5-year budget reflecting value chain development costs for coconuts, papaya, avocado, citrus and mango. It is broken down based on the two development components per crop programs, including revitalization, production enhancement, post-harvest handling and market access. Notably, the cost for the entire five years for all crops stands at United States Dollars 147,669,151.75.

Table 72: Total Projected Estimates for Fruit Crops Value Chain Development

| Crops | Componnets | Total Cost in USD |
|----------|---|-------------------|
| Coconuts | Revitalization and Production Enhancement | 22,988,505.75 |

| | | |
|----------|--|-----------------------|
| | Post-Harvest Handling and Access to Market Enhancement | 7,000,000 |
| Avocados | Production Enhancement | 15,000,000 |
| | Post-Harvest Handling and Created Research Program | 11,701,646 |
| Mango | Revitalization and Production Enhancement | 8,000,000 |
| | Enhancing Post-Harvest Handling and Access to Market | 10,570,000 |
| Citrus | Revitalization and Production Enhancement | 12,500,000 |
| | Enhancing Post-Harvest Handling and Access to Market | 11,000,000 |
| Papaya | Production Enhancement | 10,000,000 |
| | Post-Harvest Handling and Created Research Program | 7,692,750 |
| Bananas | Production and Research Enhancement | 25,000,000 |
| | Post-Harvest Handling and Market Accessibility Enhancement | 6,216,250 |
| | Grand Total | 147,669,151.75 |

USD; United States Dollars

33.5. COST BENEFITS ANALYSIS FOR FRUIT CROP DEVELOPMENT

Cost benefits were computed for crops being prioritized under the fruits crop value chain on a per-hectare basis. A summary of and costs of the five fruits is presented in Table 8. The results show that fruit production will be very profitable in Liberia. The rate of return on investment about 7.7% and the total income is US\$1,002,445,800.

Table 73: Estimated Cost Benefit for Fruit Crops

| Fruit Crops Value Chain | Targeted Areas of Production in ha | Cost of Investment | % |
|-------------------------|------------------------------------|--------------------|-------|
| Papaya | 1,000 | 26,669,500 | 22.92 |

| | | | |
|---------------------------|-------|----------------------|--------|
| Avocado | 5,000 | 22,000,000 | 18.91 |
| Mango | 1,000 | 18,570,000 | 15.96 |
| Citrus | 5,000 | 17,890,000 | 15.38 |
| Bananas | 5,000 | 31,216,250 | 26.83 |
| Total Investment | | 116,345,750 | 100.00 |
| Total Income | | 1,118,791,550 | |
| | | | |
| Gross Profit | | 1,002,445,800 | |
| Returns on Investment (%) | | 7.7 | |

ha: Hectares

33.6. FINANCIAL PLAN

A financial plan for a fruit crop value chain development initiative aimed at increasing avocado, papaya, citrus, mango, coconut, and bananas output is shown in the table below. Four components imbed a variety of activities, including programs about women and youth, value addition, post-harvest processing, research, training, and nutrition. Considering the budget in Table 1 as estimated cost in US dollars and the Government of Liberia's challenges to fund the majority of its development agenda, a list of financing sources making up the holistic stakeholders for funding can be leveraged via the percentage as determined in Table 2, and a completion deadline expressed in years. Government allotments, private sector investment (both smallholders and large-scale farming), loans, and grants from domestic and foreign organizations make up the financial sources. Through the course of five years, this comprehensive strategy seeks to assist the sustainable growth of the fruit crop chains by tackling important areas including talent advancement, infrastructure improvement, and inclusion.

Table 74: Financial Plan for Fruit Crop Development

| Components | Sources | Percentage | Temline |
|---|----------------------------------|------------|---------|
| Revitalization, Production and Research Enhancement | Government of Liberia | 20% | 6 |
| | Grants | 15% | |
| | Private Sector Investment | 10% | |
| | Loans | 15% | |
| | Partnership/Baliterial Agreement | 20% | |
| | Grants | 10% | |
| Post-Harvest Handling and Market Access | Government of Liberia | 25% | 6 |
| | Donations | 10% | |
| | Loans | 5% | |

| | | | |
|--|---------------------------|-----|--|
| | Private Sector Investment | 35% | |
| | Partnerships | 25% | |

33.7. IMPLEMENTATION PROCESS/ARRANGEMENT

The Ministry of Agriculture will implement this value chain development through the existing agriculture development structure and an adoption of a new organizational (figure 3) for fruit crops to be under the principles of the crops steering committee.

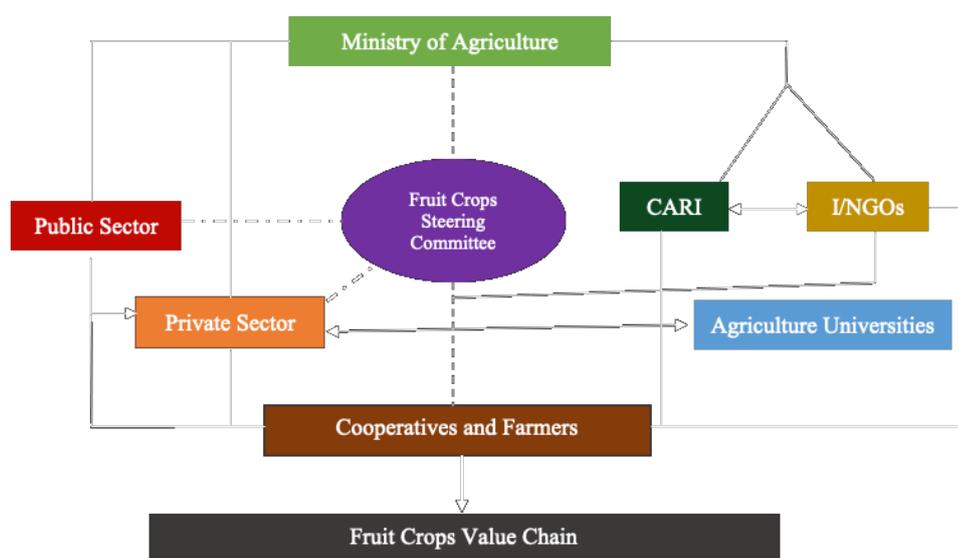


Figure 5: Propose Fruit Crop VC Development Structure

33.8. IMPLEMENTATION PLAN

Fiscal year 2030 will mark the decade long implementation of the UN SDGs and Liberia Rising Vision 2030. Similarly, Liberia will evaluate targets and long term goals toward achieving food security and middle income country. However, this value chain implementation will start with assessing the existing production areas and facilitate the development of new production areas with due consideration of targeted ha per selected crops, identified varieties per national ecology, climate adaptability, production capacity and farmers' ease of harvest.

- Develop seed gardens/regional centres and private nurseries for seed/seedlings production (with superior crop varieties) in the first three years
- Prepare and adopt a simple training manual for standards guidelines of each fruit crop for farmers and stakeholders to use in the first year
- Supervise and provide technical backstopping to all interested farmers and stakeholders in fruit crops production throughout the year by trained fruit crop experts, plant protection officers and field technicians

- Ensure fruit crops research is prioritised and speedy disseminate innovations and technologies
- For fruit decade standards, develop a national quality for post-harvesting and product development

33.8.1. Public Private Partnership

The major partners in marketing, processing, import and exports are fruit traders (wholesalers and retailers), producers, processors, importers and exporters. These partners will be linked to production, value and preservation technologies as they are the main actors in fruit marketing processing and export. Their knowledge will be augmented of the varieties for consumption, processing and quality standards the market demands of importing countries. Therefore, public-private partnerships in fruit production and post-harvest handling desired varieties development and quality inputs, demand quality and scales of production and other standards will be sought. The research on all fronts will be led by the Central Agricultural Research Institute and National Agriculture Colleges and Universities coordinated and guided by the MOA. Policy to guide fruit development will be led by MOA.

Research on fruit will not be limited to the confines of CARI facilities. In all steps and processes of fruit development, the public-private partnership from inputs and germplasm introduction to the export of finished fruit products and fresh fruit to other countries will be linked and worked together. Regional and Private nurseries and orchards also will be utilized as research sites and distribution centers. Fruit processing and storage facilities through the national mechanization hubs will be established in different parts of the country to link fruit producers and they should supply the saplings and production technology of the varieties they need to the farmers of niche pockets in collaboration with government extension authority. Farmers cooperatives and farming communities will be encouraged to have their nurseries with quality standard sapling/seedling production of the varieties they need for their farm and plantation in niche pockets with buyback guarantee of the fruits produced thereof. This will help to sustain the supply of raw fruits to the markets.

33.8.2. Major Stakeholders and Their Responsibilities

The implementation of the fruit crop value chain development will be under the supervision coordination, monitoring and evaluation of the Ministry of Agriculture. However, other major government ministries, institutions and agencies will be involved. They include: the Central Agricultural Research Institute, Liberia Agriculture Commercialization Regulatory Authority, Cooperative Development Agency, Liberia National Standard Laboratory, National Investment Commission, Ministry of Commerce and Industry, Forestry Development Authority, Environmental Protection Authority, Ministry of Internal Affairs, Liberia Land Authority.

Local and international non-government organizations, Agriculture Colleges and Universities, Farmer Cooperatives and Association and private sector will also be involved.

33.8.3. 1.2.1 Responsibilities of Government/Public Stakeholders

Table 75: List of Stakeholders Responsibilities in FVC Development

| Stakeholders | Institutions | Responsibilities |
|--------------------------------|--|--|
| Public | Ministry of Agriculture | <ul style="list-style-type: none"> - Lead, coordinate and supervise the the value chain development - Establish the Fruit Crop Steering Committee - Develop or Update national land use and climate adaptation priorities in collaboration with EPA, LLA, FDA, and MIA - Conducive policy formulation, enforcement and facilitation for large scale production, import and export in collaboration with CDA, NIC, LACRA and LNSL - Quality monitoring of planting materials and products for export and import in collaboration with CARI, CDA and LACRA - Conduct a baseline survey of different fruits to record crop-wise production area and productivity to rectify the present doubtful data - Interaction with different stakeholders and campaign to inform farmers about the importance of fruits and its production, marketing and consumption and introduce fruits crops in the national agroforestry and intercropping strategies |
| | Central Agricultural Research Institute | <ul style="list-style-type: none"> - Technology generation, variety development and maintenance of fruit crop seed garden; Collection, introduction and evaluation of both indigenous and exotic germplasm - Update varietal characteristics of all indigenous and exotic fruits cultivated in Liberia - Develop modern production technology and demonstrate both in regional centers and demo establishments in innovative farmers/communities' fields on a sharing basis in collaboration MOA, NGOs and private sectors |
| | Liberia Agriculture Commercialization Regulatory Authority | <ul style="list-style-type: none"> - Conducive policy formulation, enforcement and facilitation for large scale production, import and export - Business support services (pricing and market trend) |
| | National Investment Commission | <ul style="list-style-type: none"> - Prepare business plans and investment packages of practices for each selected fruit crops in collaboration with MOA |
| | Ministry of Internal Affairs | <ul style="list-style-type: none"> - Include fruit in national cities' beautification strategies in collaboration with MOA |
| Partners | Local and International NGOs | <ul style="list-style-type: none"> - Awareness raising, demonstration of homestead garden and orchard establishment in coordination with MOA for nutrition security and income generation - Lobby and support the Government to make conducive policies and give appropriate roles to all stakeholders - Advocate and support the establishment of the Fruit Crop Steering Committee, which will play an important role in it |
| Higher Institution of Learning | Agriculture Colleges and Universities | <ul style="list-style-type: none"> - Prioritize Fruit crops research and development in annual senior students' research projects in collaboration with CARI |

| | | |
|----------------|--|---|
| Private Sector | Farmers, Farmer Cooperatives and Companies | <ul style="list-style-type: none"> - Collaborate with the government in the establishment, and commercialization of fruits with commercial orchard/plantations with specific purposes such as import substitution, export promotion and for processing purposes - Entrepreneurship development by the private sector and nursery establishment and quality seedling production in collaboration with CARI - Fruit Crop seed gardens and mechanization hubs developed by the government and private sector for seed/seedling production and post-harvest processing of industrial varieties and to supply raw fruits to processing industries large orchards/plantations and fruit products companies - Construct multi-chamber storages maintaining different temperatures and humidity for different fruits and other produce and store fruits to regulate supply and produce different products - Develop cold storage in collaboration with the government - Facilitate the purchase of a mobile chamber/container with all facilities which may be useful for storing high-value fruits in transitional points at the port - Fruit processing industries establishment, market promotion and post-harvest management - Business support services (Collection, marketing, processing, storage and trade) by private sector and conduction of different entrepreneurship development training by the private sector |
|----------------|--|---|

FVC: Fruit Crops Value Chain; EPA: Environmental Protection Agency; LLA: Liberia Land Authority; FDA: Forestry Development Authority; MIA: Ministry of Internal Affairs; CDA: Cooperative Development Agency; NIC: National Investment Commission, LACRA: Liberia Agriculture Commercialization Regulatory Authority and LNSL: Liberia National Standards Laboratory

33.9. RISKS AND MITIGATING MEASURES

Table 76: List of Risks and Mitigation Measure for VC

| Assumptions | Risk Assessment | Mitigating Measures |
|--|-----------------|---|
| Smallholder farmers knowledge of Fruit cultivation | Medium | - Provide capacity through research and extension |
| People's knowledge about the nutritive importance of fruits in human food | Medium | - Increase awareness and education on balanced diet |
| Smallholder farmers lack knowledge of the profitability of the Fruit crop Market | High | - Facilitate LACRA coverage of fruit crops - Sensitization of smallholders and cooperatives |
| Land and Climate suitability for fruit production | Medium | - Assess and reclassify the national climate profile and develop a land use map - Regularly enhance capacity for soil amendment |
| Infrastructure to support fruit crops post-harvest handling | High | - Facilitate and provide the needed infrastructure support - Facilitate on-farm and community-based industry - Develop regional cold storages |

| | | |
|---|--------|---|
| Unemployment of youth in peri urban areas | High | <ul style="list-style-type: none"> - Promote fruit crops in the national peri urban agriculture programs - Include fruit cultivation in the cities beautification - Promote fruit entrepreneurship program |
| Extension program and strategies complies with the recommended quality delivery | Medium | <ul style="list-style-type: none"> - Strengthen MOA extension capacity to include fruit crop production - Ensure I/NGOs include recommended fruit extension services in their programs |

I/NGOs: Local and International Non-Governmental Organizations; Ministry of Agriculture; LACRA: Liberia Agriculture Commercialization Regulatory Authority

CHAPTER FOUR: LIVESTOCK VALUE CHAIN PROGRAMS

XXXIV. LIVESTOCK VALUE CHAIN PROGRAMS

34.1. CONTEXT

Majority of Liberians, especially women, depend on agriculture-related activities for their livelihoods. Women account for 80 percent of agricultural labor force. More than 76 percent of rural households have low diet diversity, thus indicating that actions to improve access to food should focus on promoting the inclusion of vegetables, fruits, pulses and animal-source foods in their diets¹

Livestock including poultry is a growing sub-sector in Liberia and it contributes to the household and community economy and employment with sustenance and food security. It is an integral component of the agricultural economy performing a role in the livelihoods of poor people. Traditional systems accounted for 100% of the holdings of cattle, goats and sheep; 58% of pigs and 100% of guinea fowl² the contribution of agricultural Gross Domestic Product (GDP) accounted for 75% and the livestock sub-sector accounts for about 17% of GDP and given a target 2 to expand domestic production to satisfy 50% or more of the national need³

Given the structuring of the Bureau of Livestock, under the Department of Technical Services within the Ministry of Agriculture, review of the livestock sector is not an easy task due to the absence or inaccessibility of documentation and data. There are three major public sector institutions dedicated to livestock development in Liberia. They are: National Livestock Bureau (NLB) within the Ministry of Agriculture; the Department of Livestock (DoL) at Central Agricultural Research Institute (CARI), Suakoko, Bong County; and University of Liberia (UL), College of Agriculture and Forestry. The mandate of NLB includes all activities related to livestock health and production. It has provisions for disease diagnosis, development of breeds, feeds, fodder, meat inspection, quarantine, extension, procurement and distribution of vaccines and medicines. Since 1984, the mandate has remained almost unchanged. A major role of NLB is to create an enabling environment for the development of the livestock sub-sector. DoL has the mandate to perform research particularly need-based research in the health and production of livestock⁴. However, due to the under-development of the Livestock subsector, little or less attention is placed on the development of Livestock farmer organizations. The only organization that are currently active, are the farmer organizations in the poultry sector, as well as the swine producer association of Liberia. Beside these, there is no other known organizations on livestock. At the former slaughterhouse to Jamaica Road, the cattle sellers or the butchers have a form of organization, but not well structured.

In order to provide an overarching agenda for the nation's agricultural Development plan, the Government of Liberia's developmental manifesto through the ARREST agenda seeks to develop all agricultural activities owing to the fact that agriculture is the foundation upon which the nation can be developed with supports from international organizations and development partners to implement initiatives aimed at improving livestock production and productivity.

These initiatives include efforts to strengthening the veterinary services, promoting and improving animal husbandry practices, as well as providing training and extension services to farmers, and developing the market infrastructure to create link for farmers to improve their income generation.

34.2. JUSTIFICATION OF THE LIVESTOCK VALUE CHAIN PROGRAMS

Evolution of the value chain: The evolution of the livestock value chain in Liberia has been shaped by various factors including historical context, socio-economic changes, government policies, and external influences. Historically, Liberia has a tradition of small-scale livestock farming, with indigenous communities engaging in subsistence-level of animal husbandry. Livestock such as cattle, goats, sheep, and poultry were primarily raised for household consumption and as a source of additional income through local markets. However, investing in the livestock value chain in Liberia presents numerous opportunities that can significantly contribute to the country's economic development

Even though there have been other studies conducted recent on the Liberia Agriculture sector holistically, information has not yet been released. As it stands, what has been published says that, household-based livestock farmers are dominant most of whom are chicken rearers and very little else, 24% and 43% of households are involved in livestock and poultry production, respectively². The numbers of livestock in Liberia are estimated to be 8,275 cattle, 120,114 goats, 48,600 sheep, 70,520 pigs, 1,270,875 chickens and 53,350 ducks³ and show the steady growth of livestock compared to crop, fisheries and forestry. There has been an increase in the number of livestock (41.2%) and poultry (22%) households than the pre-war (1988), but the numbers of livestock (7%) have increased by 2014.

34.3. KEY ISSUES FACING THE LIVESTOCK VALUE CHAIN

Several factors facing the forward movement of the livestock value chain in Liberia, especially from the systems of production to marketing of various livestock and livestock products. These challenges hinder the sector's potential for growth and development. Addressing these key issues facing the livestock value chain in Liberia requires coordinated efforts from government, development partners, private sector stakeholders, and local communities;

Limited Infrastructure: Inadequate infrastructure, including roads, transportation networks, and storage facilities, are hampering the movement of livestock and livestock products from production areas to markets. Lack of cold storage and processing facilities results in post-harvest losses and reduces the quality and shelf-life of perishable products.

Low Productivity: Low productivity levels in livestock farming, is due to poor breeding practices, inadequate veterinary services, limited extension service delivery and limited access to quality feed and safe water. Traditional production methods and management practices that result in suboptimal growth rates, low reproduction rates, and high mortality rates among livestock.

Limited Access to Inputs and Services: Smallholder farmers often face challenges accessing inputs such as improved breeds, vaccines, and veterinary services. High costs and limited availability of feed, fertilizers, and medications further constrain productivity and profitability in their production.

Disease Outbreaks affecting animal health: Livestock diseases, including infectious diseases and parasitic infestations (PPR, FMD, CBPP, Trypanosomiasis, CCPP, NCD, Fowl Cholera, and Gastrointestinal Parasites) pose significant risks to animal health and production. Weak disease surveillance and control systems exacerbate the impact of outbreaks, leading to substantial losses for farmers and threatening food security.

Weak Market Linkages: Limited access to markets and marketing information prevents farmers from obtaining fair prices for their products. Middlemen and traders often dominate the livestock marketing chain, exploiting smallholder farmers and capturing a large share of the profits.

Limited Value Addition: The lack of processing and value addition facilities limits opportunities for adding value to livestock products and diversifying the product range. Without value addition, farmers miss out on opportunities to earn higher returns and access niche markets for processed and value-added products.

- **Environmental Degradation:** Uncontrolled grazing practices and deforestation contribute to land degradation, soil erosion, and loss of biodiversity in livestock production areas. Improper waste management from intensive livestock farming operations can pollute water sources and degrade the environment.
- **Climate Change Vulnerability:** Climate variability and extreme weather events, such as droughts and floods, pose risks to livestock production systems, affecting feed availability, water resources, and animal health. Limited adaptation strategies and resilience measures leave livestock farmers vulnerable to the impacts of climate change.

Investment opportunities Although Liberia's performance in the Livestock Production Index has increased considerably over the past two decades, but about 75%, of the country is still dependent on importation of animal products. To reduce the dependency on imports, Liberian government is seeking for investments across the livestock and poultry value chain in areas such as redevelopment of pastures, restocking of improved species, and breeds and establishing meat processing centers across the country¹. The matrix provides the reasons to invest Agriculture in Liberia ranging from demands, business climate, sectorial opportunities, skilled and cost-effective labor and governments political will support the agricultural sector.

Table 77: Reasons to invest in Liberia livestock

| Strong demand | Stable Business Climate | Attractive Sectoral Opportunities | Preferential Market Access | Skilled and Cost-Effective Labor | Strong Government Support |
|--|--|--|---|--|---|
| As populations grow and incomes rise, there's typically an increased demand for animal products such as meat, milk, and eggs. Liberia's population growth, urbanization, and improving economic conditions may contribute to a rising demand for livestock products. | Livestock products are consumed locally in Liberia, providing a stable market. Additionally, there may be opportunities to export products to neighboring countries or even further abroad, tapping into regional and international markets. | Investing in the livestock sector can create jobs across the value chain, from farming and animal husbandry to processing, distribution, and marketing. This can contribute to poverty reduction and economic development by providing livelihoods for rural communities | Liberia is strategically located on the west coast of Africa and provides access to major international markets. Liberia has also formed international trade relationships with many major markets, granting preferential access and opportunities for export. | 65% of the working population in Liberia is under 25, providing a youthful and eager workforce. Skill development programs are ensuring skills availability in a wide range of sectors. Salary costs are cost-effective compared to other locations | The Liberian government has offered incentives, subsidies, or support programs to encourage investment in the livestock sector through the Ministry of Agriculture projects. This could include infrastructure development, access to finance, and capacity building initiatives. |

Economic Development: Liberia's agriculture sector, including livestock production, has immense potential for economic growth due to the country's abundant natural resources and favorable climatic conditions. Investment in the livestock value chain can stimulate economic development by creating jobs along the production, processing, and distribution stages. Developing infrastructure such as slaughterhouses, cold storage facilities, and good transportation networks can improve market access and facilitate trade, further boosting the economic activities of the country.

Food Security: Livestock products are essential sources of protein and essential nutrients, yet Liberia faces challenges with food insecurity, particularly in rural areas (LFS, 2018). Therefore, investing in the livestock value chain can enhance food security by increasing domestic production of meat, milk, and eggs, thereby reducing reliance on the importation of frozen products, and ensuring a stable supply of nutritious food for the population. Improving animal health services, breeding programs, and feed management practices can enhance productivity and contribute to food self-sufficiency.

Poverty Reduction and Youth Employment: Agriculture, including livestock farming, remains the primary source of livelihood for the majority of Liberia's population, particularly in rural areas. Investment in the livestock value chain can create opportunities for smallholder farmers to increase their income and improve their livelihoods. Supporting youth entrepreneurship in livestock production and related activities such as feed manufacturing, veterinary services, and agribusiness can address youth unemployment and poverty by providing viable employment opportunities¹.

Economic Diversification: Liberia's economy is heavily reliant on the mining sector, making it vulnerable to fluctuations in commodity prices and external shocks. Investing in the livestock value chain offers opportunities for economic diversification by promoting agriculture as an alternative source of income and reducing dependence on a single sector. Value addition activities such as meat processing, dairy products, and leather production can create additional revenue streams and contribute to a more resilient and diversified economy.

Sustainable Agriculture: Sustainable livestock production practices can contribute to environmental conservation and natural resource management in Liberia. Investment in sustainable agriculture technologies and practices, such as agroforestry, rotational grazing, and soil conservation measures, can improve soil fertility, water quality, and biodiversity. Promoting sustainable land management practices in livestock farming can mitigate the impacts of deforestation, soil erosion, and climate change, thereby ensuring the long-term viability of the sector

34.4. THE THEORY OF CHANGE OF THE LIVESTOCK VALUE CHAIN PROGRAMS

Table 78: Theory of change for the development of the livestock value chain

| What are Main issues to be solved to boost the value chain development? | What will be the transformation/change to develop? | What will be the results coming out of these transformation/change? | Who will be the main agents of change or transformation? | What are the assumptions that will drive change (political will of the Government, commitment of technical and financial partners, participation of young people and women, etc.)? | What will be the impacts and links with the Global Government economic policies |
|--|---|--|---|---|---|
| <p>Limited Access to Inputs and Services:</p> <p>Smallholder farmers often face challenges in accessing quality breeds, veterinary services, feed, and other inputs essential for livestock production.</p> | <p>Activities and interventions that involve a range of actions that are aimed at improving various aspects of the livestock sector, such as production, processing, marketing, and policy development.</p> <p>Solution: Improve access to inputs and services through the establishment of input supply chains, mobile veterinary clinics, and extension services. Provide training and capacity building to enhance farmers' skills in livestock management. Improving rural infrastructure, such as roads, bridges, and irrigation systems, can enhance access to</p> | <p>Investment in Infrastructure:</p> <p>Develop infrastructure such as roads, transportation networks, market facilities, and cold storage facilities to improve access to markets and enhance value addition opportunities.</p> <p>Enhanced Access to Inputs and Services:</p> <p>Increase availability and affordability of quality breeds, feed, veterinary services, and extension support to smallholder farmers to improve productivity and animal health.</p> | <p>Government Agencies:</p> <p>Ministries of Agriculture, Livestock, and Rural Development play a central role in formulating policies, regulations, and programs to support the development of the livestock sector. They are responsible for providing strategic direction, allocating resources, and coordinating efforts to address key challenges</p> | <p>Political Will and Commitment of the Government:</p> <p>Assumption: The government is committed to supporting the development of the livestock sector through policy reforms, resource allocation, and institutional strengthening.</p> <p>Rationale: Political will and leadership are essential for creating an enabling environment, implementing supportive policies, and mobilizing resources to address challenges and capitalize on opportunities within the sector.</p> | <p>Trade and Market Dynamics:</p> <p>Changes in Liberia's livestock sector, such as increased productivity, improved quality standards, and enhanced market access, can affect global trade dynamics for livestock products. For instance, increased exports of meat, dairy, or other livestock products from Liberia could impact global prices and trade flows.</p> <p>Conversely, global economic policies, such as trade agreements, tariffs, and market access restrictions, can influence Liberia's ability to access international markets for its livestock products. Changes in trade policies of</p> |

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| | <p>agricultural inputs and services</p> <p>Strengthening agricultural extension services can provide farmers with access to information, training, and technical assistance</p> <p>Government-led input subsidy programs can make agricultural inputs more affordable and accessible to smallholder farmers</p> <p>Developing efficient and inclusive agricultural value chains can improve access to markets and enhance farmers' bargaining power</p> <p>Examples include improving animal health services, providing training to farmers, investing in infrastructure (e.g. veterinary clinics, market facilities), promoting value addition and market linkages, and implementing policy reforms to support sustainable livestock production.</p> | | <p>and promote sustainable growth</p> | | <p>major trading partners can affect Liberia's export opportunities and market competitiveness.</p> |
|--|---|--|---------------------------------------|--|---|

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|--|---|--|--|---|--|
| | <p>Policy and Regulatory Reforms:</p> <p>Implement policy and regulatory reforms to create an enabling environment for the livestock sector. This includes streamlining bureaucratic processes, ensuring transparency and accountability, and removing barriers to investment and innovation.</p> | | | | |
| <p>Poor Animal Health and Disease Management:</p> <p>Disease outbreaks such as Newcastle disease, foot-and-mouth disease, and brucellosis pose significant threats to livestock health and productivity.</p> <p>Inadequate Infrastructure:</p> <p>Poor infrastructure, including roads, transportation networks, market facilities, and cold storage facilities, hinders the movement of</p> | <p>Monitoring and Evaluation:</p> <p>Establish robust monitoring and evaluation systems to track progress, measure impact, and identify areas for improvement. Ensure accountability and transparency in the implementation of interventions and policies.</p> <p>Solution: Strengthen disease surveillance, prevention, and control measures through vaccination programs, quarantine protocols, and</p> | <p>Promotion of Climate-Smart Practices:</p> <p>Encourage adoption of climate-smart livestock production practices such as agroforestry, water harvesting, and pasture management to enhance resilience to climate change and mitigate environmental impacts.</p> <p>Value Addition and Market Linkages:</p> <p>Promote value addition activities such as processing, packaging, and branding to increase the value of livestock</p> | <p>Development Partners:</p> <p>International organizations, bilateral and multilateral donors, and non-governmental organizations (NGOs) provide technical and financial support to strengthen the capacity of the livestock sector. They contribute to infrastructure development, capacity building, research, and</p> | <p>Commitment of Technical and Financial Partners:</p> <p>Assumption: Technical and financial partners, including international organizations, development agencies, and private sector entities, are committed to supporting the livestock sector through investment, technical assistance, and knowledge sharing.</p> <p>Rationale: External support can complement government efforts and provide critical resources, expertise, and innovation to address capacity gaps, scale up interventions, and leverage additional funding for</p> | <p>Investment and Financing:</p> <p>Investment in the livestock sector of Liberia may involve participation from international investors, development finance institutions, and multilateral organizations. Global economic policies related to investment regulations, financial markets, and development assistance can influence the flow of investment and financing into Liberia's livestock sector.</p> <p>Additionally, changes in global economic</p> |

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| <p>livestock and livestock products.</p> | <p>veterinary outreach services. Invest in disease-resistant breeds and promote biosecurity practices on farms</p> <p>Solution: Invest in infrastructure development to improve transportation networks, build market infrastructure, and establish cold storage facilities to reduce post-harvest losses and enhance market access for producers.</p> | <p>products and access higher-value markets.</p> <p>Policy and Regulatory Reforms:</p> <p>Implement policy and regulatory reforms to create an enabling environment for private sector investment, innovation, and entrepreneurship in the livestock sector.</p> | <p>innovation, and help implement targeted interventions to address specific challenges.</p> <p>Community-Based Organizations (CBOs):</p> <p>CBOs represent grassroots organizations, cooperatives, and community associations that support local development initiatives in the livestock sector. They facilitate farmer-led approaches, promote collective action, and strengthen community resilience to shocks and stresses.</p> <p>Youth and Women Groups:</p> | <p>sustainable development outcomes.</p> <p>Participation of Young People and Women:</p> <p>Assumption: Young people and women are actively engaged in the livestock sector as producers, entrepreneurs, and decision-makers, contributing to its growth, innovation, and inclusivity.</p> <p>Rationale: Empowering young people and women in the livestock sector can enhance productivity, resilience, and social equity by harnessing their potential as agents of change, unlocking new perspectives and solutions, and promoting gender equality and youth employment.</p> | <p>conditions, such as fluctuations in commodity prices, currency exchange rates, or interest rates, can impact the availability and cost of financing for livestock production and related activities in Liberia.</p> <p>Climate Change and Environmental Policies:</p> <p>The livestock sector is a significant contributor to greenhouse gas emissions and environmental degradation globally. Changes in global environmental policies, such as regulations to mitigate climate change or protect biodiversity, can influence Liberia's livestock sector through measures related to emission reductions, land use, and conservation.</p> <p>Similarly, efforts to promote sustainable agriculture and reduce environmental impacts within Liberia's livestock sector can align with global initiatives and commitments, contributing</p> |
|--|---|---|---|--|--|

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| | | | <p>Youth and women groups represent important demographics within the livestock sector. They contribute to innovation, entrepreneurship, and social empowerment, and play a crucial role in driving change and transformation towards more inclusive and sustainable development outcomes.</p> | | <p>to broader goals of environmental sustainability and climate resilience</p> |
| <p>Climate Change and Environmental Degradation:</p> <p>Climate change impacts, including changing rainfall patterns and increased frequency of extreme weather events, affect livestock production systems and exacerbate environmental degradation.</p> | <p>Solution: Promote climate-smart livestock practices such as agroforestry, water harvesting, and pasture management to enhance resilience to climate change and mitigate environmental impacts. Support sustainable land management practices to prevent land degradation and preserve biodiversity.</p> | <p>Capacity Building and Knowledge Transfer:</p> <p>Invest in capacity building initiatives, training programs, and extension services to provide farmers with the skills and knowledge needed to improve livestock management practices and access market opportunities.</p> | <p>Private Sector:</p> <p>Private sector actors, including commercial farms, agribusinesses, input suppliers, processors, and retailers, drive innovation, investment, and market development in the livestock</p> | <p>Access to Markets and Market Linkages:</p> <p>Assumption: Livestock producers have access to well-functioning markets, value chains, and market information systems that enable them to sell their products at fair prices and capture value-added opportunities.</p> <p>Rationale: Access to markets is crucial for incentivizing investment, stimulating</p> | <p>Food Security and Nutrition:</p> <p>Changes in the livestock sector of Liberia can impact food security and nutrition outcomes both domestically and globally. Improvements in livestock productivity, market access, and value addition can enhance food availability, access, and utilization, benefiting local populations and</p> |

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| | | <p>Youth and Women Empowerment:</p> <p>Empower young people and women to actively engage in the livestock sector through training, capacity building, and access to finance,</p> <p>Research and Innovation:</p> <p>Support research and innovation in livestock production technologies, breeding programs, disease control measures, and sustainable farming practices to drive productivity gains and improve resilience.</p> | <p>sector. They play a critical role in value addition, market linkages, and job creation, and contribute to increasing productivity and competitiveness within the sector</p> <p>Farmers and Producers:</p> <p>Smallholder farmers and livestock producers are key stakeholders in the livestock sector. They are responsible for managing livestock production systems, implementing best practices, and adapting to changing market dynamics and environmental conditions. Their participation and engagement are essential for</p> | <p>production, and generating income for livestock producers, thereby promoting economic growth, reducing poverty, and enhancing food security and nutrition.</p> <p>Investment in Infrastructure and Technology:</p> <p>Assumption: There is sufficient investment in infrastructure (e.g. roads, storage facilities, processing plants) and technology (e.g. improved breeds, veterinary services, information systems) to support the sustainable development of the livestock sector.</p> <p>Rationale: Adequate infrastructure and technology are essential for enhancing productivity, efficiency, and competitiveness within the livestock value chain, reducing post-harvest losses, and facilitating market access and value addition.</p> <p>Climate Resilience and Natural Resource Management:</p> <p>Assumption: Livestock production systems are resilient</p> | <p>contributing to global food security.</p> <p>Conversely, disruptions in Liberia's livestock production or trade due to factors such as disease outbreaks, natural disasters, or trade restrictions can have ripple effects on food supply chains and prices, affecting food security outcomes at the national and global levels.</p> <p>Food Security and Nutrition:</p> <p>Changes in the livestock sector of Liberia can impact food security and nutrition outcomes both domestically and globally. Improvements in livestock productivity, market access, and value addition can enhance food availability, access, and utilization, benefiting local populations and contributing to global food security.</p> <p>Conversely, disruptions in Liberia's livestock</p> |
|--|--|--|---|---|---|

| | | | | | |
|--|--|--|--|---|--|
| | | | <p>achieving sustainable development outcomes.</p> | <p>to climate change impacts and promote sustainable natural resource management practices that safeguard biodiversity, water resources, and ecosystem services.</p> <p>Rationale: Climate resilience and environmental sustainability are critical for ensuring the long-term viability of the livestock sector, minimizing vulnerability to climate-related shocks, and protecting livelihoods and ecosystems for future generations</p> | <p>production or trade due to factors such as disease outbreaks, natural disasters, or trade restrictions can have ripple effects on food supply chains and prices, affecting food security outcomes at the national and global levels</p> |
|--|--|--|--|---|--|

34.5. THE DEVELOPMENT OBJECTIVE OF THE LIVESTOCK VALUE CHAIN PROGRAMS

To enhance the productivity and efficiency of livestock production systems to meet growing demand for animal protein and contribute to food security.

Specific Objectives

Increase the availability and accessibility of animal protein (meat, milk and eggs):

- Increasing the availability and accessibility of animal protein in Liberia requires a multi-faceted approach that addresses various aspects of livestock production, distribution, and market accessibility

Develop livestock farming for diversification of rural income and employment opportunities:

- To reduce reliance on food imports and increase domestic production and self-sufficiency in livestock products in Liberia, improving access to markets for animal

Improving Animal Product Access to Market to reduce reliance on food imports:

- To reduce reliance on food imports and increase domestic production and self-sufficiency in livestock products in Liberia, improving access to markets for animal products is crucial.

Enabling Livestock Policies and Regulatory Framework:

- Developing robust livestock policies and regulatory frameworks is essential to promote sustainable practices, safeguard natural resources, and mitigate environmental impacts in Liberia.

XXXV. CATTLE VALUE CHAIN PROGRAM

35.1. EXPECTED OUTPUT

- major cattle production ranches across the country rehabilitated and restocked
- National cattle breeding program developed to support expansion local cattle production
- National livestock policy formulated to guide development of the sector
- National veterinarian service delivery system strengthened

35.2. KEY STRATEGIC INTERVENTIONS

35.2.1. Rehabilitate and restock 7 major ranches

The MoA will rehabilitate and restock 7 major ranches by improving infrastructure, organizing and planning grazing areas for cattle, rehabilitating livestock watering points, increasing cattle up to 10 per hectare, plan livestock vaccination and improving veterinary care,

35.2.2. Develop a national cattle breeding program to support expansion local cattle production

The MoA and CARI will develop a national cattle breeding program to support the expansion local cattle production based on the use of improved local breeds with these main steps:

- Needs Assessment and Planning: Conduct a comprehensive needs assessment to identify the current status of the national cattle herd, existing breeding practices, productivity levels, and areas for improvement.
- Genetic Evaluation and Selection: Collect and analyze data on the genetic characteristics, performance, and pedigree information of cattle within the national herd.

Implement a breeding Program Management:

- Provide training and capacity-building opportunities for farmers, extension workers, veterinarians, and breeders on modern breeding techniques, genetic principles, data recording, and breeding management practices.
- Support research and extension activities to disseminate knowledge, best practices, and technologies related to cattle breeding and genetics to stakeholders across the country.
- Collaboration and Stakeholder Engagement

35.2.3. Elaborate on a National livestock policy to guide development of the sector

The MoA will enable Livestock Policies and Regulatory Framework to promote sustainable practices to safeguard natural resources and mitigate environmental impacts

35.2.4. Strengthen National Veterinarian Service Delivery System to improve animal health

The MoA will strengthen the national veterinarian service delivery system by training veterinary officers, improving diagnostic, prevention and treatment methods and means for the most prevalent animal diseases, and improving the logistics of veterinary service operations

35.3. BUDGET OF CATTLE VALUE CHAIN

Table 79: Investment cost of the cattle value chain

| Components | Costs USD |
|---|--------------------|
| rehabilitate and restock 7 major ranches | 36 000 0000 |
| develop a national cattle breeding program to support expansion local cattle production | 3 000 000 |
| Elaborate a national livestock policy to guide development of the sector | |
| Strengthen National veterinarian service delivery system to support animal health | 5 999 240 |
| Enabling Livestock Policies and Regulatory Framework to promote sustainable practices to safeguard natural resources and mitigate environmental impacts | 1 000 000 |
| | 45,999,240 |

XXXVI. SHEEP AND GOATS RESTOCKING VALUE CHAIN PROGRAM

36.1. CONTEXT

Sheep and goat production in Liberia has a long history, intertwined with the country's agricultural development, socio-economic dynamics, and environmental factors. **However**, sheep and goats have been part of Liberia's traditional livestock-keeping practices in with indigenous communities, particularly in rural areas, raising these animals for meat, and other products to meet their dietary and livelihood need Goat population in Liberia raised around 361 850 in 2021 and the sheep population is around 431.7000 in 2023.

During the colonial period, which lasted from the mid-19th century until Liberia's independence in 1847, European settlers introduced modern livestock farming practices, including improved breeds of sheep and goats. However, these initiatives were primarily focused on meeting the needs of the settler population rather than benefiting indigenous communities. However, after independence, Liberia experienced periods of economic growth and investment in agriculture. Efforts were made to modernize the livestock sector, including the introduction of improved breeds, veterinary services, and infrastructure such as abattoirs and market facilities. However, these initiatives were often limited in scope and failed to reach many rural areas.

Due to the civil war that last for more than a decade (1989-2003) had a devastating impact on the country's agricultural sector, including livestock farming. Many farmers were displaced, livestock populations were decimated, and infrastructure was destroyed. The conflict also disrupted traditional livestock keeping practices and led to a decline in animal husbandry skills and knowledge. Years following the civil war, efforts were made to rebuilding Liberia's agricultural sector, including sheep and goat production. International aid agencies, non-governmental organizations (NGOs), and government initiatives supported restocking programs, capacity building for farmers, and the rehabilitation of infrastructure.

Despite these efforts, sheep and goat production in Liberia continues to face numerous challenges and constraints. These include limited access to veterinary services and healthcare, inadequate infrastructure, poor breeding practices, low productivity of local breeds, and vulnerability to diseases and climate change.

Sheep and goat production in Liberia remains predominantly small-scale and subsistence-oriented, with most animals raised by rural households for household consumption and local markets. Commercial production is limited but has the potential for growth with targeted interventions to address key constraints. There is growing recognition of the importance of sheep and goat production for food security, poverty reduction, and rural development in Liberia. Efforts to promoting sustainable intensification, improve breeding stock, strengthening veterinary services, and enhancing market access can contribute to the growth and resilience of the sector.

36.2. EXPECTED OUPUTS

The project will be targeting six counties, namely, Nimba, Lofa, Bong, Grand Gedeh, Grand Bassa and Bomi Counties with a farming population of 1,000 farmers

36.3. KEY STRATEGIC INTERVENTIONS

The key strategic interventions to promoting sustainable restocking of sheep and goats with resilient and locally adapted breeds by enhancing biodiversity, reducing pressure on natural resources, and promoting eco-friendly farming practices such as rotational grazing and agroforestry in Liberia will be:

Increase the population of resilient and locally adapted breeds of sheep and goats in targeted six counties, namely, Nimba, Lofa, Bong, Grand Gedeh, Grand Bassa and Bomi Counties to enhance food security and livelihoods,

- The MoA will conduct a thorough assessment of the local context, including environmental conditions, socio-economic factors, existing livestock practices, and market dynamics, to tailor the restocking program to specific needs and priorities.
- The MoA in partnership with CARI will develop strategies for genetic improvement of the restocked populations, including selective breeding, controlled mating, and introduction of superior genetics through artificial insemination or breeding programs, to enhance productivity and resilience over time.
- The MoA will Provide training and capacity-building programs for farmers and extension workers on sustainable sheeps and goat management practices, including breeding techniques, healthcare, nutrition, pasture management, and climate-smart agriculture, to enhance their skills and knowledge
- The MoA will improve access to veterinary services, including vaccination programs, disease surveillance, and treatment of common livestock diseases, by strengthening veterinary infrastructure and training local veterinarians and para-veterinary workers.
- The MoA will invest in the necessary infrastructure to support restocking activities, such as breeding centers, quarantine facilities, veterinary clinics, water sources, and fencing, to ensure the health and well-being of the restocked animals.

Empower smallholder farmers, especially women and youth, by providing them with access to resilient breeds of sheep and goats for breeding, income generation, and nutrition, thereby contributing to poverty alleviation and gender equality.

- The MoA will engage with local communities, farmers, government agencies, NGOs, and other relevant stakeholders to ensure their participation and ownership of the restocking program.
- The MoA will conduct a thorough assessment of the specific needs and priorities of smallholder farmers, women, and youth in the target communities regarding sheep and goat farming.

- With CARI support the MoA will proceed to selection of Resilient Breeds: Identify and select resilient breeds of sheep and goats that are well-suited to the local environment, resistant to diseases, and have desirable traits for breeding, income generation, and nutrition.
- The MoA will develop training and capacity Building programs to support smallholder farmers, particularly women and youth, on breed selection, sheep and goat management practices, nutrition, breeding techniques, and income generation opportunities.
- The MoA will facilitate access to Quality Breeding Stock: Facilitate access to quality breeding stock of selected resilient sheep and goat breeds through government livestock programs, private breeders, or community breeding initiatives.
- CARI will support the MoA to establishing breeding centers: Set up breeding centers or community-based breeding programs to promote the production and distribution of quality breeding stock among smallholder farmers.
- The MoA will provide support and training on feed and nutrition management practices to ensure the optimal health and productivity of sheep and goats in the communities.
- The MoA will facilitate market linkages for smallholder farmers to sell their sheep and goats and livestock products at fair prices.

Table 80: Projected beneficial counties

| Selected counties | No of targeted farmer |
|--------------------------|------------------------------|
| Nimba | 200 |
| Lofa | 200 |
| Bong | 200 |
| Bassa | 150 |
| Grand Gedeh | 150 |
| Bomi | 150 |
| Total | 1,000 |

36.4. BUDGET 2024-2030

Table 81: Investment cost for the sheep and goat value chain

| COMPONENT 1: Increase the population of resilient and locally adapted breeds of sheep and goats in targeted six counties, namely, Nimba, Lofa, Bong, Grand Gedeh, Grand Bassa and Bomi Counties to enhance food security and livelihoods. | | | | | |
|--|--|-----------|----------|-----------|----------------|
| N0 | Description | Frequency | Quantity | Unit cost | total |
| | Purchasing of does & ewes | 1 | 3,000 | 75.00 | 225,000.00 |
| | Purchasing of bulks & rams | 1 | 1,000 | 80.00 | 80,000.00 |
| | Construction of shelters | 1 | 1,000 | 150.00 | 150,000.00 |
| | Training for farmers | 3 | 1,000 | 25 | 75,000.00 |
| | Transportation of animals | 1 | 4,000 | 20 | 80,000.00 |
| COMPONENT 2: Empower smallholder farmers, especially women and youth, by providing them with access to resilient breeds of sheep and goats for breeding, income generation, and nutrition, thereby contributing to poverty alleviation and gender equality | | | | | |
| | Description | Frequency | Quantity | Unit cost | total |
| | Provide training and capacity-building programs to smallholder farmers, particularly women and youth, on breed selection, livestock management practices, nutrition, breeding techniques, and income generation opportunities. | 3 | 1000 | 25 | 75,000,00 |
| | Establishment of Breeding Centers | 1 | 3 | 20,000 | 60,000,00 |
| | Taining for Feed and Nutrition Management | 3 | 1000 | 25 | 75,000, 00 |
| | Community Participation and Empowerment training | 3 | 1000 | 25 | 75,000,00 |
| TOTAL | | | | | 865,000 |

XXXVII. POULTRY VALUE CHAIN PROGRAM

37.1. CONTEXT

Liberia's poultry production is influenced by several factors, including its geographical, economic, and social context and as such understanding these contextual factors is essential for developing strategies to support and improve poultry production in Liberia, ensuring food security, income generation, and sustainable agricultural development

Liberia is located in West Africa, with a tropical climate conducive to poultry farming. However, there are regions with varying climatic conditions that might affect production, such as rainfall patterns and temperature fluctuations. Liberia has a mixed economy with agriculture playing a significant role. Poultry farming contributes about 40% to the agricultural sector and provides employment opportunities, particularly in rural areas. The country's economy has faced challenges due to past conflicts and underdevelopment, impacting infrastructure, investment, and access to resources for poultry production.

Poultry farming is often practiced by small-scale farmers in Liberia, with both rural and urban households engaging in backyard poultry rearing. Family-owned farms are common, and poultry production serves as a source of income and nutrition for many households. Cultural preferences and dietary habits also influence the demand for poultry products in the country. Due to the limited infrastructure, including inadequate road networks and access to electricity and water, has posed a serious challenge to poultry production, especially in remote areas. Lack of modern technology and equipment for poultry farming also have hindered productivity and efficiency.

According to 2021 statistics, Liberia imported US\$43 million worth of poultry products, becoming one of the largest countries in the world for importing poultry meat. Poultry farms in Liberia contribute 40% towards the egg market, and the rest is imported.

Like many other countries, Liberia faces challenges related to disease control in poultry farming. Outbreaks of diseases such as Newcastle disease and avian influenza can have devastating effects on poultry populations, thus leading to economic losses and food insecurity. But however, government policies and support programs aimed at promoting agriculture, including poultry farming, play a crucial role.

Many poultry farmers in Liberia currently encounter challenges of high production costs due to feed purchases and the importation of day-old chicks. As, also known as maize, is one of the grains used in the poultry diet, but it is grown by farmers in Liberia mainly for human food consumption and not for animal feed. As a result, poultry farmers have to rely on the importation of feed for their birds from neighboring countries.

Initiatives such as training programs, subsidies, and access to credit can help small-scale poultry farmers improve their production practices and enhance their market access. Domestic demand for poultry products in Liberia is influenced by factors such as population growth, urbanization, and income levels. Additionally, competition from imported poultry products affects local producers, highlighting the need for market regulation and support for domestic producers to remain competitive.

Poultry production contributes to food security by providing a consistent source of animal protein. With Liberia's history of food insecurity and malnutrition, particularly in rural areas, locally produced poultry can help meet the nutritional needs of the population. Poultry farming can serve as a source of income for small-scale farmers, especially in rural areas where alternative livelihood opportunities may be limited. Selling eggs, meat, and live birds can provide steady cash flow and improve the livelihoods of farming households.

Poultry farming creates employment opportunities along the value chain, including farming, processing, marketing, and distribution. This can help alleviate unemployment, especially among youth and women, contributing to economic development and poverty reduction. Therefore, investing in poultry production can stimulate rural development by empowering local communities and improving infrastructure. By providing training, access to resources, and market linkages, the poultry sector can enhance the socio-economic well-being of rural in Liberia.

Liberia currently relies heavily on imports to meet a significant portion of its poultry demand. Developing the domestic poultry industry will reduce the dependency on imports, conserve foreign exchange, and strengthens the country's food sovereignty. However, poultry products are rich in essential nutrients, including protein, vitamins, and minerals. Promoting local poultry production improves access to nutritious foods, contributing to better health outcomes, particularly among vulnerable populations such as children and pregnant women.

Compared to large-scale livestock farming, poultry production generally has a lower environmental footprint in terms of land use, water consumption, and greenhouse gas emissions. Emphasizing small-scale, sustainable poultry farming practices can mitigate environmental degradation and promote agroecological resilience. It is important that diversifying our agricultural activities, including poultry farming, will enhance the resilience of rural economies to external shocks such as climate change, market fluctuations, and disease outbreaks. Integrating poultry into mixed farming systems can provide multiple income streams and risk mitigation strategies for farmers.

37.2. OBJECTIVES OF THE SHEEP AND GOATS VALUE CHAIN

- To produce sufficient quantities of poultry meat and eggs to meet domestic demand, reducing reliance on imports and ensuring consistent access to affordable protein-rich foods for the population.

- To enhance dietary diversity and nutritional outcomes by promoting the consumption of locally produced poultry products, particularly among vulnerable groups such as children and pregnant women.
- To create income-generating opportunities for rural communities through small-scale poultry farming, empowering farmers to improve their economic well-being and livelihood resilience.
- To increase the productivity and efficiency of smallholder poultry farmers through training, access to improved breeds, better feed, veterinary services, and sustainable farming practices.
- To develop a well-functioning poultry value chain, including production, processing, marketing, and distribution, to maximize economic benefits for all stakeholders and create employment opportunities along the chain.

37.3. EXPECTED OUTCOMES

- Four large-scale indigenous poultry farmers supported to engage in broiler production to reduce Liberia poultry meat import by 75% over five years
- Four commercial layer farmers provided incentives for egg production to achieve national self-sufficiency
- Private-sector investment facilitated for the establishment of local hatcheries for day-old chicks' production
- farmer-based organisations (FBOs) in 9 counties to implement modern poultry farms involving at least 2800 framers will be supported by the MoA and its partners to increase poultry production (meat and layers) to reduce Liberia poultry meat import by 75% over five years

37.4. KEY STRATEGIC INTERVENTIONS

37.4.1. 2.1. Support Construction of Poultry houses in 9 Counties

Following the model set by the FAO, which supported the establishment of one modern poultry farm in the counties of Bong, Lofa and Nimba, the MoA and its partners will support farmer-based organisations (FBOs) in 9 counties to implement modern poultry farms; Grand Bassa, Grand Gedeh, Grand Kru, Grand Cape Mt, Rivercess, River Gee, Lofa, Maryland, Nimba, Bong, Margibi, Montserrado, Bomi, Gbarpolu, Sinoe. Each building will be stocked with at least 1000 broilers for meat production and 500 layers for egg production

- The MoA will support the implementation of 4 large-scale Indigenous poultry farmers

The MoA will facilitate Private-sector investment for the establishment of local hatcheries for day-old chicks' production

37.4.2. 2.2. Strengthening farmers capacity

The MoA will also underpin capacity building as a major cornerstone for a viable poultry enterprise. Besides training in improved poultry production, vaccine application, feed formulation and other associated but essential inputs will be provided to farmers in the 9 counties

37.5. BUDGET FOR POULTRY

Table 82: Investment cost for the poultry value chain

| Components | Total in USD |
|--|------------------|
| Support construction of poultry houses in 9 Counties | 837 450 |
| Support the implementation of 4 large-scale indigenous poultry farmers | 300 000 |
| Support the implementation of 4 large-scale indigenous poultry farmers | 450 000 |
| TOTAL | 1 587 450 |

Table 83: Description of budget items of the poultry value chain

| N0 | Description | Frequency | Quantity | Unit cost | Total |
|----|----------------------------------|-----------|----------|-----------|---------------|
| | Purchase of day-old chicks | 1 | 15,000 | 1.85 | 27,750 |
| | Transportation of stock | 1 | | | 15,000 |
| | Vaccines | 2 | 30,000 | 40.00 | 1,200,000 |
| | Feeding | | 126 tons | 950 | 119,700 |
| | Construction of modern poultries | 1 | 9 | 25000 | 225,000 |

Table 84: Selected counties for implementation

| No | Counties | No of farmers |
|--------------|------------------|---------------|
| 1 | Grand Bassa | 200 |
| 2 | Grand Gedeh | 200 |
| 3 | Grand Kru | 150 |
| 4 | Grand Cape Mount | 150 |
| 5 | Rivercess | 150 |
| 6 | River Gee | 150 |
| 7 | Lofa | 250 |
| 8 | Maryland | 175 |
| 9 | Nimba | 250 |
| 10 | Bong | 250 |
| 11 | Margibi | 200 |
| 12 | Montserrado | 200 |
| 13 | Bomi | 150 |
| 14 | Gbarpolu | 150 |
| 15 | Sinoe | 150 |
| TOTAL | | 2775 |

XXXVIII. PIGGERY VALUE CHAIN PROGRAM

38.1. Context

Pig has a relatively high potential to contribute to increased productivity on account of their high fecundity, feed conversion efficiency, short generation interval and early maturity (Ouma et al., 2013; Mbuthia et al., 2015). Pork production reached about 40,000 tons in 2016, and projections for 2020 indicate an increase of about 10% (Mfewou and Lendzele, 2018) in Liberia. Native pigs of Liberia make substantial contribution to human livelihoods, employment generation and food security as well as their superior adaptation to harsh environmental conditions and resistance to endemic diseases (MOA, 2008)

Liberia's tropical climate provides favorable conditions for pig farming in certain regions. The variations in the rainfall patterns and temperature across the country can affect the availability of feed and water, impacting pig production. Pig farming contributes about 25% to the agricultural sector in Liberia, providing employment opportunities and income for small-scale farmers. The sector plays a role in rural livelihoods and poverty alleviation, although economic challenges such as limited access to credit, high input costs, and market access barriers can hinder its growth. Pigs are valued for their role in traditional ceremonies, cultural events, and social gatherings in Liberia. Additionally, pork is a popular meat choice in the country, reflecting cultural preferences and dietary habits. Small-scale pig farming is often practiced by rural households, contributing to food security and household income.

Limited infrastructure, including inadequate transportation networks, electricity, and access to veterinary services, can constrain pig production and marketing in Liberia. The adoption of modern farming practices, improved breeds, and technologies such as pig housing and waste management systems is essential for enhancing productivity and profitability. Disease outbreaks, such as African swine fever and porcine reproductive and respiratory syndrome, pose significant threats to pig health and production in Liberia. Effective disease surveillance, biosecurity measures, vaccination programs, and access to veterinary services are crucial for disease control and prevention.

Government policies and support programs play a vital role in promoting pig production and addressing challenges faced by farmers. Initiatives such as training, extension services, access to inputs, and market development efforts can strengthen the pig sector and contribute to agricultural development. The domestic demand for pork products in Liberia is influenced by factors such as population growth, urbanization, income levels, and cultural preferences. However, competition from imported pork products and informal markets can affect local producers' profitability and market access.

Sustainable pig farming practices, including waste management and environmental conservation, are essential for minimizing negative impacts on natural resources, soil, and water quality. Adoption of agroecological principles and organic farming methods can promote environmental sustainability in pig production.

Pig farming is not only profitable, not only guarantees between 15-35% returns on investment, not only has the potential to expand quickly but it's also capital intensive. And yes, most of the cost of production will go into feeding and no! pigs do not eat anything for your commercial pig farm to make profit.

38.1.1. Developing pig production in Liberia can have several significant benefits for the country

- Food Security: Increasing pig production can help to enhance food security by providing a local and sustainable source of protein for the population. Pork is a nutritious animal protein that can contribute to a well-balanced diet.
- Income Generation: Pig farming can serve as a valuable source of income for small-scale farmers, especially in rural areas. By selling pigs, pork meat, or pig-related products, farmers can improve their economic livelihoods and reduce poverty.
-
- Employment Opportunities: the development of the pig production sector can create employment opportunities along the entire value chain, including pig farming, feed production, processing, transportation, and marketing. This can help to boost economic development and reduce unemployment rates.
- Diversification of Agriculture: Introducing pig production can contribute to diversifying the agricultural sector in Liberia. This can reduce reliance on traditional crops and enhance overall agricultural productivity and resilience.
- Reduced Imports: By developing a local pig production industry, Liberia can reduce its dependency on imported pork products. This can lead to cost savings, improved trade balance, and increased self-sufficiency in meeting domestic meat demands.
- Environmental Benefits: Properly managed pig production systems can also have environmental benefits, such as utilizing agricultural by-products for feed, promoting sustainable land management practices, and generating organic fertilizers from pig manure

Overall, the development of pig production in Liberia can contribute to economic growth, food security, employment generation, and sustainable agriculture. It can also help to improve the livelihoods of small-scale farmers and promote overall food self-sufficiency in the country.

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38.2. EXPECTED OUTPUTS

Support to 1,225 farmers across the country

38.3. KEY STRATEGIC INTERVENTIONS

38.3.1. Improved Breeding and Genetics

- CARI will support by: (i) introducing high-quality pig breeds that are well-suited to the local environment and have desirable traits such as fast growth, high meat yield, and disease resistance, (ii) Implementing breeding programs to improve the genetics of the local pig

population and enhance overall productivity, (ii) train farmers on proper breeding practices, including selection of breeding stock, mating techniques, and management of breeding programs.

38.3.2. Enhanced Feeding and Nutrition

- The MOA and CARI will support farmers: (i) to develop appropriate feed formulations using locally available feed ingredients to meet the nutritional requirements of pigs at different stages of growth, (ii) promote sustainable feeding practices by incorporating feed additives, minerals, and vitamins to optimize pig health and growth, (iii) provide training on feeding management, feeding schedules, and effective use of feed resources to maximize production efficiency and minimize costs.

38.3.3. Disease Control and Health Management

- The MoA will support: (i) implementation of biosecurity measures to prevent the introduction and spread of diseases in pig farms. This includes proper farm sanitation, quarantine procedures, and controlling access to the farm, (ii) develop vaccination programs and treatment protocols in collaboration with veterinary professionals to control common pig diseases and ensure good health status and train farmers on early detection of diseases, proper diagnosis, and appropriate treatment options to reduce mortality rates and improve overall health.

Table 85: Targeted counties for the piggery value chain development

| No. | Counties | No. of farmers | No. of piglets | Total piglet | Unit cost/USD | Total/USD |
|--------------|---------------|----------------|----------------|--------------|---------------|----------------|
| 1 | Grand Bassa | 100 | 2 | 200 | 100.00 | 20,000 |
| 2 | Grand Gedeh | 100 | 2 | 200 | 100.00 | 20,000 |
| 3 | Grand Kru | 50 | 2 | 100 | 100.00 | 10,000 |
| 4 | Grand Cape Mt | 50 | 2 | 100 | 100.00 | 10,000 |
| 5 | Rivercess | 50 | 2 | 100 | 100.00 | 10,000 |
| 6 | River Gee | 50 | 2 | 100 | 100.00 | 10,000 |
| 7 | Lofa | 100 | 2 | 200 | 100.00 | 20,000 |
| 8 | Maryland | 75 | 2 | 150 | 100.00 | 15,000 |
| 9 | Nimba | 100 | 2 | 200 | 100.00 | 20,000 |
| 10 | Bong | 100 | 2 | 200 | 100.00 | 20,000 |
| 11 | Margibi | 100 | 2 | 200 | 100.00 | 20,000 |
| 12 | Montserrado | 200 | 2 | 400 | 100.00 | 40,000 |
| 13 | Bomi | 50 | 2 | 100 | 100.00 | 10,000 |
| 14 | Gbarpolu | 50 | 2 | 100 | 100.00 | 10,000 |
| 15 | Sinoe | 50 | 2 | 100 | 100.00 | 10,000 |
| TOTAL | | 1,225 | 2 | 2,450 | 100.00 | 245,000 |

38.4. BUDGET

Table 86: Investment cost for piggery value chain development

| Components | Total in USD |
|---------------------------------------|------------------|
| Improved Breeding and Genetics | 300,447 |
| Enhanced Feeding and Nutrition | 200,000 |
| Disease Control and Health Management | 372 000 |
| TOTAL | 872,447.5 |

Table 87: Details of the piggery value chain development budget

| Description | Frequency | Quantity | Unit cost |
|----------------------------|------------------|-----------------|------------------|
| Purchase of pigs | 1 | 2,450 | 100 |
| Purchase of DOC | 1 | 27,750 | 1.85 |
| Purchasing of does & ewes | 1 | 3,000 | 75.00 |
| Purchasing of bulks & rams | 1 | 1,000 | 80.00 |
| Construction of shelters | 1 | 1,000 | 150.00 |
| Training for farmers | 3 | 1,000 | 25 |
| Transportation of stock | 1 | | |
| Vaccines | 2 | 27.75 | 40.00 |

38.5. THE IMPLEMENTATION ARRANGEMENTS PLAN

The implementation arrangements plan outlines the structure, processes, and responsibilities for executing the transformational changes in the livestock sector of Liberia. Here's an overview of the key elements of the implementation arrangements plan.

Table 88: Implementation arrangement plan for the livestock value chain

| Implementation Area | Description | Implementation agent(s) |
|-------------------------------------|---|--|
| Governance Structure | Establish a multi-stakeholder governance structure comprising government agencies, development partners, private sector stakeholders, civil society organizations, and academia. This structure will provide oversight, guidance, and coordination for the implementation of interventions in the livestock sector. | Livestock Technical working Group (MOA, MOCI, NGO's, Academia) |
| Lead Implementing Agencies | Designate lead implementing agencies responsible for coordinating specific thematic areas or components of the implementation plan. These agencies will oversee the planning, implementation, monitoring, and evaluation of activities within their respective mandates. | MOA |
| Technical Working Groups | Form technical working groups composed of experts and stakeholders with relevant expertise in livestock production, marketing, policy, research, and other key areas. These groups will provide technical input, develop action plans, and monitor progress towards achieving implementation targets. | MOA & Partners |
| Capacity Building and Training | Conduct capacity building workshops, training programs, and knowledge exchange sessions to build the skills and capacity of stakeholders involved in implementing interventions in the livestock sector. This will ensure that stakeholders have the necessary knowledge and expertise to effectively carry out their roles and responsibilities. | MOA & Learning Institutions |
| Resource Mobilization and Financing | Develop a resource mobilization strategy to secure funding and resources for implementing interventions in the livestock sector. This may involve leveraging domestic resources, engaging with development partners, mobilizing private sector investment, and accessing grant funding and concessional loans. | MOA & Partners |

| | | |
|---|--|-------------------------|
| Monitoring and Evaluation Mechanisms | Establish robust monitoring and evaluation mechanisms to track progress, measure impact, and identify areas for improvement. This may include setting up monitoring indicators, conducting baseline assessments, collecting data, and conducting regular reviews and evaluations of implementation progress. | MOA & Partners |
| Communication and Stakeholder Engagement | Develop a communication strategy to disseminate information, raise awareness, and engage stakeholders in the implementation of interventions in the livestock sector. This may involve organizing workshops, seminars, and outreach events, as well as utilizing traditional and digital media channels for communication. | MOA Field Staff |
| Partnerships and Collaboration | Foster partnerships and collaboration among government agencies, development partners, private sector stakeholders, civil society organizations, and academia. This may involve establishing formal partnerships, joint initiatives, and collaborative projects to leverage expertise, resources, and networks for implementation. | Technical Working Group |
| Policy Advocacy and Institutional Strengthening | Advocate for policy reforms and institutional strengthening measures to create an enabling environment for the development of the livestock sector. This may involve engaging policymakers, advocating for supportive policies and regulations, and building the capacity of institutions responsible for livestock development. | MOA & Partners |
| Adaptive Management and Learning | Adopt an adaptive management approach that allows for flexibility, learning, and adaptation based on feedback, evidence, and changing circumstances. This involves regularly reviewing progress, identifying lessons learned, and adjusting implementation strategies as needed to ensure the effectiveness and relevance of interventions | MOA & Stakeholders |

38.6. THE FINANCING PLAN

The financing plan outlines the financial resources needed to implement the transformational changes in the livestock sector of Liberia. It details the sources of funding, allocation of resources, and strategies for mobilizing financing to support the implementation of interventions

Table 89: Financing plan for the livestock value chain programs

| Source of Funding | Amount (USD) | Purpose |
|---------------------------|------------------|--|
| GoL National Budget | 193,579,240.00 | Expansion of Production Capacity |
| International Aid (grant) | 980,000.00 | Infrastructure Development & Pasture and Ranch Establishment |
| Bank Loans | 1, 290,000.00 | Technology Adoption & Research |
| International Aid (grant) | 150,000.00 | Policy & Regulatory Frame works |
| Private Investment | 3,505,503,794.00 | Reduction on importation |

38.7. RAPID COST-BENEFIT ANALYSIS

A rapid cost-benefit analysis provides a preliminary assessment of the potential costs and benefits associated with implementing the transformational changes in the livestock sector of Liberia. While a comprehensive cost-benefit analysis requires detailed data and rigorous analysis, a rapid assessment can help policymakers and stakeholders understand the potential economic implications of the proposed interventions. Here's a simplified outline of the rapid cost-benefit analysis:

Table 90: Cost and benefit analysis of Livestock VC in Liberia

| Category (Targets) | Costs | Output | Benefits |
|---------------------------------|--------------------|--------------------|--------------------|
| Production | 128,580,000.00 | 353,595,000.00 | 225,015,000.00 |
| Infrastructures | 980,000.00 | 12,740,000.00 | 11,760,000.00 |
| Policy & Regulatory Frame work | 150,000.00 | 450,000.00 | 300,000.00 |
| Research & Capacity Development | 1,440,000.00 | 4,320,000.00 | 2,880,000.00 |
| Total | 131,150,000 | 371,105,000 | 239,955,000 |

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**CHAPTER FIVE: FISHERIES AND AQUACULTURE
VALUE CHAIN PROGRAMS**

XXXIX. FISHERIES AND AQUACULTURE VALUE CHAIN

39.1. CONTEXT

Liberia, one of the least developed and a low-income nation in the world is endowed with natural resources and abundance of water as well as a climate favorable to agriculture.¹⁴ Classified as an agrarian state with a population of 5.3 million¹⁵ of which 30.2% are engaged in agriculture; the country has an annual growth rate of 3.0 from 2008-2022.¹⁶ The population with a rapid growth which also has socio-economic implication constitutes about 40.32 % and the percentage ratio of the youth population presents both opportunities and challenges for the country including the need to provide education, training and employment opportunities for the youth. A significant portion of the population approximately 40.9% continues to live on less than USD1.90 per day¹⁷. “The figure signifies around two million people are undernourished as of 2022 and the prevalence of undernourishment in the total population remains as high as 38.4% (2020-2022) with more than eight percent of the population experience severe food and nutritional insecurity and 93% of the population cannot afford a healthy diet”.¹⁸

Fisheries currently represent approximately 10% of Liberia’s agriculture gross domestic product (GDP) and three percent of national GDP.¹⁹ Average per capita annual fish consumption is estimated to be 5.0 kg²⁰ and the second most purchased food commodity which provides 20% of animal protein intake²¹ The sector provides means of employment for over 13,000 fishermen and 18,000 post-harvest handlers and processors along the Liberian coast²² and about three million people throughout the West Africa²³ where Liberia sits as the fourteenth largest fish producer.²⁴ Around 80 % of those working in the Liberian fisheries sector are indigenes while the Ghanaians (Fante) constitute larger volume of the other 20% (Senegalese, Gambians, Ivorians, Togolese, etc). Female constitute 60 % of the workforce spread over 114 landing sites along the coast.²⁵

Fisheries and aquaculture are important to the national economy of Liberia because it provides an inexpensive source of protein, employment opportunities, generates foreign earnings and enhances food security considering the continental shelf area which has considerable marine fish species. The marine fisheries resources include bonny, bonga, barracuda, pike fish, cassava fish, sole fish, grouper and grunter as well as tuna and tuna-like species which are harvested on

¹⁴ Food and Agriculture Organization of the United Nations (FAO), *Liberia at a glance* (2024) cited at <<https://www.fao.org/liberia/liberiaataglance>>, accessed on April 2, 2024.

¹⁵Ibid.

¹⁶ Liberia Institute of Statistics and Geo Information Services, ‘*Population and Housing Census: Final Results*’ (2022) *Appendix, Table A6: Distribution of the Population by Sex and Age Group*, p.74.

¹⁷ The Global Economy.com at The United Nations, ‘Liberia: Human Development’, cited at <https://www.theglobaleconomy.com>, accessed on April 3, 2024

¹⁸ FAO, 2024.

¹⁹ The World Bank: Liberia Sustainable Management of Fisheries (P172012), cited at <<http://documents1.worldbank.org/curated/en/483401576480235332/pdf/concept-project-information-document-P1D-Liberia-Sustainable-Management-of-Fisheries-P172012.pdf>>, accessed on April 5, 2024.

²⁰ National Marine Fisheries Service, Per Capita Consumption, cited at <http://www.st.nmfs.noaa.gov/st1/fus/fus11.08_percapita2011.pdf>, 2011, at USAID, ‘The Importance of Wild Fisheries for Local Food Security’, Liberia, 2020; FAO Fisheries and Aquaculture Department, Summary tables of Fishery Statistics: Food Balance Sheets 2011, cited at <<ftp://ftp.fao.org/FI/STAT/summary/default.htm>>, 2011, accessed on April 6, 2024, USAID, ‘The Importance of Wild Fisheries for Local Food Security’, Liberia, 2020., cited at <https://>, accessed on April 6, 2024.

²¹ World Food Programme, Liberia Comprehensive Food Security and Nutrition Survey (CFSNS), cited at http://foodsecuritycluster.net/sites/default/files/CFSNS-FINAL_Liberia-2013, accessed on April 5, 2024.

²² Republic of Liberia, Ministry of Agriculture, ‘Value Chain Analysis’, 2022 p. 4.

²³ J. Chu et al, ‘*Impact evaluation of a fisheries development project*’, Marine Policy, vol. 85, (2017), pp. 141-149, 10.106/J.MARPOL, 2017.08.024.

²⁴ The Economic Community of West African States (ECOWAS) Commission, Department of Agriculture, Environment and Water resources, Directorate of Agriculture and Rural Development, ‘Fishery and Aquaculture Statistical Factsheets of the ECOWAS Member Countries’, Jan 2020, page 26, cited at <<https://>>, accessed on April 8, 2024.

²⁵ Republic of Liberia, Ministry of Agriculture, Bureau of National Fisheries, ‘*Fisheries and Aquaculture Policy and Strategy*’, 2014, p. 10.

a commercial basis.²⁶ Crustaceans, cephalopods and mollusks are less abundant, but are of much higher value than finfish species, and are targeted for Liberia's export market.²⁷

The Liberian fisheries are classified into marine (industrial, semi-industrial, artisanal, recreational), inland and aquaculture with the artisanal of both the marine and inland fisheries constituting 86% of fisheries in the country.²⁸ Reports revealed that both 3,615 artisanal canoes and 740 semi-industrial vessels using various fishing gears including ring, drift, set, gill and line net²⁹ produced 18,086 tons of both pelagic and demersal fish in 2020 and six industrial trawl fishing vessels targeting demersal species produced, 5,113 tons of fish in the Liberian Waters during the same period;³⁰ There are also 56 tuna vessels targeting tuna and tuna-like species operating in the marine fisheries with a total production of 9,691 tons; but these products did not land in the country due to a lack of necessary infrastructure.³¹ Although, there was no data available for both the inland and recreational fishery, however, anecdotal evidence suggests that recreational fishers may catch significant quantities of large pelagic species, and that the inland fisheries production may be different from the current estimate (40,000 t).³²

“There are currently hatcheries operated by the National Fisheries and Aquaculture Authority (NaFAA) in Klay, Bomi and in Zwedru, Grand Gedeh; a previous site in Tassah, Bong has ceased operations. No private sector hatcheries exist in Liberia. Surveys conducted by the NaFAA found that there were only 300 fish farmers in Liberia, overseeing 1,704 ponds of which only 66 percent or 1,125 ponds were in use with the average pond size measured at 464 m². A total of 114 hectares were estimated nationwide across all 1,704 existing ponds, and the average in-use land was 73.3 hectares. Nine counties which contain almost 90% of the fish farms reported using only fresh water. Annual production is currently around 40 metric tons”,³³ with farmers producing mostly tilapia African catfish, sampa, mango tilapia and red belly tilapia. Nile tilapia and other tilapia varieties account for 93% of the production.³⁴ NaFAA predicts that aquaculture has the potential to produce 15,000 metric tons of fish annually by 2030 if key challenges can be addressed”.³⁵

Fisheries data indicated an imbalance in fish trade with fish import recorded at USD12, 932,100 in 2020 while fish export showed USD3, 583,490 during the same period.³⁶ Although, the sub-sector has great potential for production, the marine resource can be depleted over time and therefore needs to be rationally and optimally exploited;³⁷ as such, a profound attention is required for management and development of the sub sector in bolstering food security.

²⁶ Western Central Pacific Fisheries Commission (WCPFC), Scientific Committee Nineteenth Regular Session, Koror-Palma, (16-24 August 2023), Annual Report to the Commission, Part 1: Information and Fisheries Research and Statistics, WCPFC-SC19-AR/CCM-34, Liberia, cited at <<https://meetings.wcpfc.int>>.p.3, accessed on April 5, 2024.

²⁷ Ibid.

²⁸ FAO, GLOBEFISH Market Profile (2020), accessed at <<http://www.fao.org>>, accessed on April 5, 2024.

²⁹ MOA, above n 18.

³⁰ Liberia, Republic of Liberia, 2022 Annual Report (Part I), (2023) p.1; Liberia Fisheries, Bureau of National Fisheries –Marine Division cited at WCPFC-SC19-AR/CCM-34, <www.liberiafisheries.net/aboutus/marine>, accessed on April 4, 2024.

³¹ Ministry of Agriculture, Fish Value Chain Analysis, 2022,p.4, cited at

³² West Africa Regional Fisheries Project – Liberia grant No:H5240-LR, ‘International university to Assist the Fisheries Management Office of Bureau of National Fisheries (BNF), Republic of Liberia, Final Report, June 30, 2016, p. 34

³³Ministry of Agriculture, above n 18.

³⁴ Above, n 18, p.7.

³⁵ Ibid.

³⁶ Ibid.

³⁷ FAO, GLOBEFISH Market Profile (2020) , cited at <<http://www.fao.org>>, accessed on April 5, 2024.

Despite the socioeconomic and demographic limitations, Liberia continues to strive for growth and development through the design and implementation of various legal and policy frameworks; with a most recent prompt herald for the adoption of value-chain approach to agriculture development and the initiation of strategies that would enhance the value chains of targeted agricultural commodities including fisheries and aquaculture sub sector that invariably supports national food sufficiency, poverty alleviation and stimulate development of the national economy.

NaFAA is the arm of government responsible for the management and development of fisheries resources in Liberia. Established by ‘An Act to Create the NaFAA (2017)’; enshrined the Fisheries Management and Development Law (2019); approved the Fisheries Regulation (2010 revised in 2020); developed the Fisheries and Aquaculture Policy and Strategy Document (2014 revised in 2021); the institution is headed by a Director General who is assisted by the Deputy Director General for Technical Services and the Deputy Director General for Administration. There is a governing Board chaired by the Minister of Agriculture and includes representatives from other ministries and agencies of government. There is also a 15 member Fisheries Advisory Council (FAC), appointed in 2020 by the Director General of NaFAA, based on nominations from several government ministries and agencies. The Post-Harvest Unit of the Department of Research and Statistics is responsible for the value chain component of fisheries under NaFAA.

“Value chain can be defined as inter-linked value-adding activities that convert inputs into outputs which in turn add to the bottom line and help to create competitive advantage. A value chain typically consists of inbound distribution or logistics, manufacturing operations, outbound distribution or logistics, marketing and selling and after-sales service. The activities are supported by various organizational components purchasing or procurement, research and development, human resource development and corporate infrastructure. Value chain for capture fisheries differ from fish to fish and from country to country, and frequently within regions”.³⁸

In Liberia, the artisanal fishery is characterized by multiple actors participating in fish production and purchasing either for processing or for distribution and consumption³⁹. The industrial fishery value chain involves various stakeholders including fishermen, shore helping-hands, fish traders, fish processors, fish farmers, farm assistants, transporters, wholesalers, retailers, importers, exporters, and consumers. The industrial fishing and the artisanal fishing are also differentiated by the type of equipment used, the distances travelled by the operators from the coast, as well as their on-board/off-board post-harvest and processing capabilities.⁴⁰ The industrial fishing vessels operate beyond the 6nm zone with minimum 100 horsepower engine, using trawl in the production process, targeting offshore demersal species in the value chain. The artisanal (marine inland and aquaculture) fishery value chain is comprised mostly of fishermen using crafted Fanti styled canoes with various fishing gears with some carrying insulated box on their daily operations. Few of the fishermen use inboard or outboard motorized engine ranging between 10-40 horsepower while the majority of Liberian artisanal fishermen do not use motorized engines and operate within the 6nm zone. The aquaculture value chain on the other hand, is also underdeveloped with subsistence farmers cultivating mostly tilapia and

³⁸ De Silva D.A.M., FAO, ‘Value chain of fish and fishery products: origin, functions and application in developed and developing country markets, 021, p.7.

³⁹ Juseah, A.S., ‘A critical review of the Liberian fisheries sector- A technical report’, 2021.

⁴⁰ USAID, ‘ Value Chain Analysis: Assessment Report, The selection of the most promising Agricultural Value Chains in Liberia, p. 10.

catfish. Liberian aquaculture farmers usually have poorly constructed management system and fish feed⁴¹ and like the marine fishery, the aquaculture value chain actors deal directly with the input supply, production, processing, trading, transportation, etc. of a product. Relevant government agencies associated with the value chain include NaFAA; Ministry of Agriculture (MoA); Ministry of Health (M0H) (Competent Authority) and the Ministry of Commerce (MoC).

39.2. SWOT ANALYSIS FISHERIES AND AQUACULTURE SECTOR IN LIBERIA

The value chain has its strengths, weaknesses, opportunities and threats, as indicated in the table below:

Table 91: SWOT Analysis of Sector Stakeholders

| Stakeholder | Strength | Weakness | Opportunity | Threat |
|----------------|--|--|---|--|
| Fisherman | <ul style="list-style-type: none"> - Own fishing boat, fishing gears, crew, - - - Own insulated box, -Sell promptly, direct interaction with middle men (usually the wife/associate). - - --- Multiple actors - Semi industrial fisherman carry insulated boxes on board Belongs to an association Obtain fishing inputs on credit from sponsors | <ul style="list-style-type: none"> - Lack of own boat and fishing gears, compelled to sell to middle men - Catches are high during dry season -Artisanal fishermen do not carry insulated boxes on board Lacks bargaining power over price of product sold to sponsors | -Landed catch are sold on cash basis and not credit allowed | -Catches are low during rainy season |
| Fish processor | <ul style="list-style-type: none"> Fish processing stoves owned by individual fish processor Major processing site established in Cape Mount | <ul style="list-style-type: none"> -Inadequate infrastructure - Lack means to buy all landed catches | Another processing site establishment identified in Grand Bassa couty | -Inability to buy all landed catches lead to large post-harvest losses |
| Trader | Has no boundary relative to fish | Preservation, storage and | One landing site cluster created | Trade barriers hinder both local |

⁴¹Ibid, p.12.

| | | | | |
|---------------|--|---|---|---|
| | trade – Trades locally and internationally | processing infrastructure are inadequate | in Robertsport and a replica is modelled in Buchannan, currently on-going | and international trade |
| Middleman | Predominantly women and mostly fishermen wives Formulate themselves into an association Serve as major financier | Female dominance Limited business knowledge | Has absolute control over purchase of all landed catch Takes advantage of personal relationship with the fisherman to negotiate a fair purchasing price deal | Vulnerable to financial loss if catch is not fully exhausted by wholesaler/retailer |
| Cold storages | Fish packaged in cartons and bags | -Fish price determined by forces of demand and supply | -Fish products are readily available in chilled cartons | Inadequate or loss of power supply leads to spoilage |

The Government of Liberia (GoL) through NaFAA has over the time expressed willingness to support the fisheries sector value chain with the adoption of various legal instruments and policy documents. These fisheries instruments and documents highlight on Value Addition through the implementation of several Food and Agriculture Organization (FAO) and World Bank (WB) funded projects including the Sustainable Fisheries Alternative Livelihood Project (SFALP), the West African Regional Fisheries Project (WARFP), Liberia Sustainable Management of Fisheries Project (LSMFP) and Aquaculture projects including FishLib, DeSIRA as well as other fisheries and aquaculture value addition interventions by other local and international non-governmental organization (NGOs).

39.3. JUSTIFICATIONS FOR FISHERIES AND AQUACULTURE VALUE CHAIN

Traditional fishers have operated along the Liberian coast of and inland waters for centuries, mainly at the subsistence level. Fishers were catching fish to feed their families and excess catches were bartered for other essential commodities and goods. The first fishing trawler to operate in Liberian coastal waters belonged to the Woerman Company, a Germany company that operated in the country between 1938 and 1939. Fishing was a daily activity with the trawlers returning to port and the artisanal fishermen returning to their various landing sites at

the end of each fishing day, and catches were sold immediately to avoid post-harvest losses which can be as high as 45%;⁴² because of lack of preservation means for fresh fish.

“The value chain in fisheries involves harvesting and primary processing generally undertaken as quickly as possible after catching and secondary processing after which wholesalers bring the processed products to retailers where the consumer purchases the fish. The processing and wholesale are typically the largest value contributors in the fisheries value chain, often contributing between 20 and 60 percent of the retail value of the product. Fishing operations, on the other hand, tend to be the lowest contributor, proving between 10 and 25 percent of the final retail value. Consequently, Liberia is committed to develop a fish processing industry that provides increased employment and better salaries for Liberians. In addition, various support industries are required, such as production of packaging, transport and factory maintenance so the potential for job creation is far wider than just the fishing itself. Processing and associated industries will also contribute to government revenue through taxation and this can bring in valuable foreign currency”.⁴³

The Klay fish Hatchery was re-established in 1999 by Lutheran World service in collaboration with the Ministry of Agriculture, with funding from the European Union (EU). The site was earlier used by private individuals as cultural center. Later, it was transformed into an Industrial training site for basic craft before the Peace Corps took over its operation in late 1960s to train fishery technicians. At the time the site was developed and laid out with 35 small ponds of 100 square meters each. Currently there 1,704 existing ponds, and the average in-use land was 73.3 hectares with the average pond size measured at 464 m².⁴⁴

Data collection is paramount to fisheries management as policy and decision makers use data to determine the required action for the sustainable management of the resources. Fisheries enumerators assigned at selected landing sites use mobile phone applications to collect catch and effort data on small-scale fisheries while fisheries observers assigned on board fishing vessels collect similar data for industrial fisheries. Data and information analysis is mostly conducted by the fisheries institution in isolation of the stakeholders including fisher folks who are directly involved with fishing activities and are mostly affected by the policy and management decisions. Data on processed fish (dried and smoked), fermented fish (moin-moin) are not separated from the harvested catch data as the value-added products have been captured on the landings and therefore not excluded therefrom. The below table indicates fish production for the period 2018-2022; for both the marine fisheries and aquaculture.

Table 92: Annual fish production per quarter

| Year | <i>Production(kg)</i> | | | | |
|------|-----------------------|--------------|--------------|--------------|---------------|
| | 1st quarter | 2nd quarter | 3rd quarter | 4th quarter | Total |
| 2018 | 5,580,304.38 | 6,696,365.26 | 5,580,304.38 | 4,464,243.50 | 22,321,217.52 |
| 2019 | 5,939,942.25 | 7,127,930.70 | 5,939,942.25 | 4,751,953.80 | 23,759,769.00 |

⁴² International Fund for Agriculture Development (IFAD), Investing in rural People in Liberia’, July 2016, cited at: <<http://www.ruralpovertyportal.org>>; accessed on April 11, 2024.

⁴³ Ministry of Agriculture, Bureau of National Fisheries, Project Proposal No 4 of 5, enhancement of value addition, marketing and fish trade for improved foreign exchange earnings and employment opportunities, pg. 6.

⁴⁴ Ministry of Agriculture, Fish Value Chain Analysis, 2022,p.4, cited at :.

| | | | | | |
|------|--------------|--------------|--------------|--------------|---------------|
| 2020 | 5,863,406.00 | 7,036,087.20 | 5,863,406.00 | 4,690,724.80 | 23,453,624.00 |
| 2021 | 6,369,558.94 | 7,643,470.73 | 6,369,558.94 | 5,095,647.15 | 25,478,235.76 |
| 2022 | 7,217,162.75 | 8,660,595.30 | 7,217,162.75 | 5,773,730.20 | 28,868,651.00 |
| 2023 | 6,899,680.75 | 8,279,616.90 | 6,899,680.75 | 5,519,744.60 | 27,598,723.00 |

Source: National Fisheries and Aquaculture Authority (NaFAA) 2024)

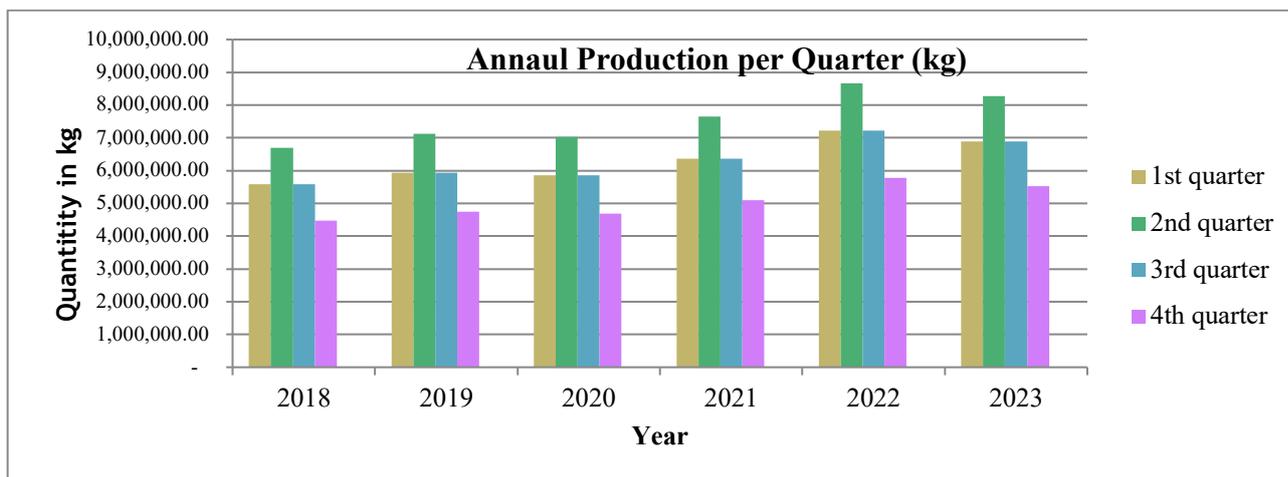


Figure 6: Graphical representation of annual production per quarter

39.4. KEY ISSUES

It is widely believed that the potential for a more thriving fisheries value chain is great⁴⁵ and fishing requires inputs considering fish is a commodity that be processed, packaged, stored, transported and sold on local and international market in a multitude of forms.⁴⁶ These activities provide profitable entrepreneurial opportunities: however, the limitations are also large. Industrial fisheries lack fisheries ports and ancillary facilities such as bunkering facilities, dry-docking facilities, ice plants, chill or cold rooms, processing areas, or support industries for packaging materials, supply of fishing gear and spare parts resulting in vessels not choosing Liberia as the preferred port-of-call. Artisanal fisheries on the other hand lack legal fishing gear, safety equipment, landing sites with fish handling and processing areas, storage facilities, ice and chill facilities, potable water, and access to markets, resulting in poor levels of hygiene and high post-harvest losses. Aquaculture requires feed and seed, improved research and technology and tools and materials for pond development.⁴⁷

One-third of reported catches is said to be wasted in various parts of the seafood value chain, globally.⁴⁸ Undoubtedly, adopting simple measures to preserve catches onboard vessels and along the value chain could reduce spoilage and increase the value of catches. Improving marketing practices can help fishers obtain better prices while investments in post-harvest practices, specifically in the reduction of post-harvest losses, could increase the value of fish

⁴⁵ Republic of Liberia, Ministry of Agriculture, Bureau of National Fisheries, 'Fisheries and Aquaculture Policy and Strategy', 2014, p 10.

⁴⁶ Ibid.

⁴⁷ Ibid.

⁴⁸ The World Bank, The Liberia Sustainable Management of Fisheries (P17012), 'Project Information Document'. Appraisal Stage | Date Prepared/Updated: 30-Jun-2021 | Report No: PIDA28789, p5.

production without catching more fish, thereby improving national and local food security and safety.

One of the pertinent issues in the aquaculture is bio-security. The use of poisonous substances including cyanide and poisonous leaves in freshwater, rivers and lakes has become prominent. This method of fishing which is considered illegal contributes to the low quality and value of fish and is equally hazardous to the health and safety of final consumers. Fish of this nature does not go through the value chain process as it decomposes within a short period of time. As such, it is advisable this method of fishing should be highly discouraged for health and safety of consumers.

One of the prevailing issues in the fisheries sector is climate change and its adaptation. Burning of fossil fuels, cutting down forests, greenhouse effect, global warming, coastal erosion, coastal beach reclamation for tourists' purposes as well as other intriguing factors affect the livelihood of fishermen and other stakeholders of the fisheries sector. In order to maintain the fish value chain, the sustainability of the ecosystem and protect the livelihood of those that depend on it, government and relevant institutions must adopt and adapt policies that would further safeguard the sectors in this regard.

39.5. INVESTMENT OPPORTUNITIES

The most common aquaculture system found in inland and brackish water in Liberia is the open system where farmers use of ponds and partly cages. Considering the pressure on wild fisheries, aquaculture development serves as an alternative in the essential need to meet the rising consumption of animal protein and exponentially preserve wild fish stock and coastal habitats as it serves as a strategic investment area for those looking to invest in food production methods of the future. As an alternative to dependence on imported fish, freshwater aquaculture, specifically tilapia cultivation, can play an important role in accelerating growth in the aquaculture segment to meet rising demand.⁴⁹ “Although Liberia has the potential to produce aquaculture valued at over \$30 million USD per year, its natural comparative advantage relative to its regional trade partners is hampered by insufficient infrastructure and limited processing and cold storage facilities. Holistic investment across the entire aquaculture business model is needed for the sub-sector to achieve its income generating potential in the domestic, regional, and global market”.⁵⁰

There are great opportunities in investment relative to the marine fisheries. Although, majority of marine fishery operations capture only a few species of fish and crustaceans, the sub-sector however has potential for profitability through expansion of the sector. Invariably, significant investments are needed in order to fully realize export competitiveness and to meet domestic demand through local production.⁵¹ Investment opportunities in fisheries and aquaculture value chain are not limited to: infrastructural development, organization structure and capacity development, ensuring that safe, quality fish products reach consumers, creation of employment opportunities, access to loan for business development, production of fish

⁴⁹ Ministry of Agriculture, ‘Value Chain Analysis, 2022, page 7.

⁵⁰ Ibid, p 8.

⁵¹ Above n 23, p.11.

fingerling and juveniles, upgrading water-based (fish cages) aquaculture system and fish brood production.

39.6. THEORY OF CHANGE

The below matrix indicates the main issue, transformation, expected results, agent of transformation, driving assumptions and impacts and links with government global policies:

Table 93: Theory of change for fisheries and aquaculture value change development

| Main issue | Transformation or change to achieve | Expected results | Main agents of transformation or change | Driving assumptions | Impacts and links with Government global policies |
|-----------------------------------|--|---|--|---|--|
| Inadequate infrastructure | Investment in Infrastructure | Reduced post-harvest fish losses, and preserve more fish for consumption and sale | Government agencies responsible for fisheries management, economic development, and environmental conservation | Lack of political will Lack of financial support | Improvements in the efficiency and quality of Liberia's fish value chain could enhance the country's competitiveness in international markets. |
| Limited Processing Facilities | Enhanced Processing Facilities | Economic development and employment opportunities | Non-governmental organizations, community-based organizations, and advocacy groups | Inadequate policy and regulatory frameworks | This aligns with global economic policies on trade liberalization, market access, and export-led growth with contribution to Sustainable Development Goals SDG 2 (Zero Hunger), SDG 8 (Decent Work and Economic Growth), SDG 14 (Life Below Water), and SDG 17 (Partnerships for the Goals). |
| Poor Handling Practices | Improved Handling Practices | Higher-quality fish products, increased market value and consumer satisfaction | Private sector actors, including fish processors, traders, and investors | Weak and outdated legislative frameworks | |
| Post-harvest losses | Reduced post-harvest losses | Increase production Increase income earnings | Academic and Research Institutions International Development Partners | Lack of community engagement | |
| Quality Standards and Regulations | Enforcement of Standards | Compliance with quality and safety standards, | | | |

| | | | | |
|----------------------------------|---|---|--|---|
| | | Enhanced consumer confidence and trust in fish products. | Local Communities and Organizations Consumers and Market Actors | Participation in international trade agreements Foreign Direct Investment (FDI) Climate Change Mitigation and Adaptation Environmental Sustainability-sustainable fishing practices also align with international agreements and frameworks, such as the Paris Agreement and the United Nations Convention on the Law of the Sea The transformation of Liberia's postharvest fish value chain intersects with various global government economic policies |
| Limited Market Access | Market Access Expansion | Boosted trade and economic growth in the sector | | |
| Limited Access to Finance | Access to Finance and micro-credit scheme is limited (microcredit) | Income Generation and Livelihood Improvement | | |
| Lack of investment opportunities | Adequate investment opportunities in fisheries and aquaculture continues to persist | Increased foreign exchange earnings Increased revenue source | | |
| Insufficient skills and Training | Continuous training and capacity building, and building research gaps among relevant institutions including MOA/CARI/NaFAA/University of Liberia (UL) | Enhanced research and innovations | | |
| Adverse environmental factors | Sustainable Practices | Resilience to climate-related risks and vulnerabilities. | | |

| | | | | |
|------------------------------|--|--|--|---|
| Policy and Governance Issues | Policy Reforms Strong legislative framework | Good governance | | related to trade, sustainability, investment, development assistance, and regional integration. |
| | Formation of exit strategy | Continuity of program through the negotiation of terms and conditions for management of infrastrucutres including g Built, Own, Operate and Transfer (BOOT) investments. | | |

Following the discussions held with the NaFAA Focal Person on value chain and judging from experience, there are numerous challenges confronting the fisheries and aquaculture sector relative to value chain and the vicious cycle seem unending while sector experts continue to exert effort in designing several strategies to ease these challenges. From the initial stage of the value chain, nearly all the artisanal fishermen set out to sea without carrying on board insulated boxes with ice to hold capture resources for preservation until they can return to their respective landing sites. Failure to place on board the canoe insulated box, renders the harvested fish species less valuable as the resource loose texture. This is a very crucial challenge that must be solved if the value chain should remain unbroken from the onset. The persons who serve as direct link between the fishermen and the wholesaler in most cases do not have immediate access to preservation in order to maintain the value chain. They are compelled to out rightly sell the fish obtained from the fishermen on less valued price bearing in mind the perishable nature of fish products and for the fact that most of them do not have processing facility that could enable them steadily continue the value chain. The fish processors serve as the conduit of distribution between the fisherman link and the wholesaler. Although, most of the fish processors have processing equipment but they are conventional type of fish dryers that contribute to the inconvenience and harsh condition under which the fish resources are processed.

Unlike modern *choko* oven, the conventional fish processing method is very rigorous, stressful and very inefficient; thus, creating sore eyes and sometime irritating skin condition. Should the processors have access to the *choko* oven the next question that arises is how knowledgeable can they operate the oven and how well can they limit poor handling of the fish prior to the product reaching the final consumers through distribution to both the local and foreign markets. This brings to mind the intriguing question – “*should fish processing method in the value chain be business as usual?*” It is obvious that the challenges which surface at the first stage of the value chain has undoubtedly denied the fishermen revenue generation and employment opportunities.

It is thoughtful enough to improve the value chain process considering the next levels of the value chain that make the importance of fisheries to the economy unattainable due to challenging circumstances. Liberian fish products are not exported to foreign markets due to lack of safety and standard, certification and eco-labelling; thus, denying the fish traders and marketers the needed foreign exchange earnings considering the imbalance trade Liberia continues to face.

Notably, investment in fisheries and aquaculture serves as conduit to development on the aggregate. Investment impacts include direct contribution to food security, provision of affordable fish by-products to help address nutritional needs, employment opportunities as a result of the population benefiting from fisheries sustainable investment. Unfortunately, there is limited access to investment opportunities in Liberia as investors lack access to finance, loan and micro-credit scheme.

Capacity development is crucial to fisheries and aquaculture development and major promoter of the change theory. Implementing comprehensive human resource development and training, research as well as advisory programs for the fisheries sector in the fisheries and aquaculture value chain including aquaculture extension services, fisheries and aquaculture business management, and other relevant areas of interest in the sector is very crucial in the advocacy for change towards development.

The theory of change remains incomplete in the absence of identifying solutions to the challenges confronting the sector which include infrastructural development, investment promotion, safety and standards promotion, provision of extension services, and of course, training and human resource development as well as research and innovations.

39.7. THE DEVELOPMENT OBJECTIVE

The development objective of the national agriculture investment plan fisheries sub-sector is:

- “Development of fisheries and aquaculture value chain through the promotion of fish trade and export market for improved earnings and increased employing opportunities for the women and youth”.

Specific Objectives

The specific objectives of the development objective include:

- Improving economic returns through establishment of post-harvest infrastructures;
- Establishing national safety and quality assurance systems to enhance safety and quality of fish;
- Promoting value addition through entrepreneurship, fish marketing and trade opportunities;
- Promoting sustainable fisheries investment;
- Setting up an enabling environment for development of aqua-business for growth of the sector
- Implementing comprehensive human resource development and training as well as advisory programs for the fisheries sector

39.8. PROGRAM COMPONENTS FOR THE VALUE DEVELOPMENT

Economic gains in fisheries value chain can be achieved through the enhancement of post-harvest activities. The NaFAA Fisheries and Aquaculture Policy and Strategy Document (Revised 2021) outlined several adoptable economic activities that would enhance the fisheries and aquaculture value chain. In order to achieve this specific objective, it is imperative on the part of national government to institute the following program components under the specific objectives: *(See Annex 1 for details)*

The program components are described below as follow:

39.8.1. Component 1: Improving economic returns through the establishment of post-harvest infrastructure

Establish fish landing cluster in at least two additional counties including Montserrado County and Grand Bassa County to enhance the earnings from the industrial and artisanal fisheries;

- This component contains the infrastructural development of the program through the construction of a fish landing cluster in two selected fishing communities in Montserrado County and Grand Bassa County, respectively. The cluster details the landing site, the processing facility, meeting hall, school, clinic, children’s playground and other basic social amenities required of a fishing community. The fishermen will land their canoes in an arranged mode and the fish processor will be housed within the facility in a systematic order where the fish are to be processed and packaged for the market thus improving the economic returns of the fish processors.

- Cluster management team needs the requisite training and capacity to manage the cluster for project sustainability.
- The above phase of the component will commence in the first year of the project and it is expected to be completed by the second year of the project. The project will be implemented by NaFAA in collaboration with other relevant ministry/agency. This project activity is expected to cost USD2,520,869.56 with funding negotiated with the World Bank.

Support the artisanal fisheries to increase the value of fish by provision of facilities for ice storage on board artisanal craft;

- Fish preservation at sea is crucial to maintaining quality of fish prior to landing. Fishermen are to carry on board, insulated container box which serves as a fish hold to keep the fish fresh at landing. Maintaining the quality of fish is a major determinant to price which eventually places the fisherman in a better position to increase his income. Packaging the fish in the insulated box requires the needed skill, as such; fishermen need to be trained in this perspective.
- This phase of the component will be implemented at all 114 major landing by NaFAA and in collaboration with the Cp-Management Association (CMA) and the Liberian Artisanal Fishermen Association (LAFA) as well as all registered fishing canoes. The component will be addressed during the first year of the project with the project cost placed at USD484,782.60. It is expected that funding would be sourced from the World Bank.

Support the fish processors by provision of modern fish drying equipment;

- Having acquired quality fish from the fishermen, the fish processors must step into the next value chain process by extending the shelf life through preservation. One of the methods of fish preservation is smoking which is common in the Liberian society. The provision of modern fish drying equipment empowers the fish processor to acquire more fish, process the fish and have enough fish for trading and marketing purposes. Fish handling and packaging training needs to be provided to fish processors in this component of the program.
- This phase of the component will be implemented at all 114 major landing by NaFAA in collaboration with the CMA, LAFA and Funding will be sourced from the World Bank. The component will be addressed during the first year of the project and is expected to cost USD 484,782.60.

The systematic implementation of Component #1 will be executed as indicated in the below work schedule:

Table 94: Implementation schedule for component 1

| Component 1 | Activity | - Year | | | | |
|---|---|--------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Improving economic return through establishment of post-harvest structure | Establish fish landing cluster in at least two additional counties including Montserrado County and Grand Bassa County | | | | | |
| | Support the artisanal fisheries to increase the value of fish by provision of facilities for ice storage on board artisanal craft | | | | | |
| | Support the fish processors by provision of modern fish drying equipment | | | | | |

39.8.2. Component 2: Supporting national safety and quality assurance systems to enhance safety and quality of fish

Adopt, sensitize and implement a capacity building on Hazard Analysis of Critical Points (HACCP) and Total Quality Management (TQM);

- HACCP and TQM are international regulations applied to fish as edible product. In order to be on par with the international standard, capacity building is required of fisheries regulating bodies and other relevant government institutions including the Ministry of Health Competent Authority, in the fish handling aspect.
- The human resource capacity for the implementation of the HACCP and TQM will be implemented by NaFAA in collaboration with the Competent Authority of the MoH; majorly in the capital city of Monrovia during the first two years of the project. The cost for this phase of the component is USD 484,782.60.

Enhance the capacity of the NaFAA for adoption of the Codex Alimentarius for fish standards, inspections and quality control of fish and fish products;

- Like HACCP and TQM, Codex Alimentarius is an international code relative to agricultural products. Requisite competence is required of the competent authority relative to fish standards, inspection and quality control. Capacity building is also required to meet international standards on fish safety and handling as the fisheries products exported from Liberia are not eco-labelled.
- The above component will be implemented by NaFAA in collaboration with relevant government institutions including Competent Authority/MoH. This phase of the project activity will cost USD 581,739.14.

On the aggregate, the total funding for this component which could be sourced externally from international partners including the EU is USD 1,066,521.74 and is expected to be implemented during the first two years of the project as indicated in the below work schedule:

Table 95: Implementation schedule for component 2

| Component 2: | Activity | - Year | | | | |
|--|---|--------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Supporting national safety and quality assurance systems to enhance safety and quality of fish | Adopt, sensitize and implement a capacity building on Hazard Analysis of Critical Points (HACCP) and Total Quality Management (TQM) | | | | | |
| | Enhance the capacity of the NaFAA for adoption of the Codex Alimentarius for fish standard, inspections and quality control of fish and fish products | | | | | |

39.8.3. Component 3: Promoting value addition through entrepreneurship, fish marketing and trade opportunities

Encourage packaging and develop fish products that add value to fish and fish products;

- Packaging forms part of the value chain because it prolongs shelf life of fish product. Species of value such as tuna and tuna-like species need to be identified and given due consideration in the packaging stage. Training on entrepreneurship, fish trade and marketing is to be provided to all interested parties in order to foster fish marketing and trade.

Promote eco-labeling of targeted export-oriented fish to enhance the commercial value at international markets; and certification of fish products for export market;

- Although, export of fish products creates earnings for foreign exchange, however, one of the processes yielding to returned earnings is eco-labeling and certification of export-oriented fish products. Capacity building in this area is paramount to fish trade and commerce.

Encourage the establishment of value addition enterprises and build capacity to meet international standards;

- Local enterprise specializing in fisheries value addition should be encouraged through friendly business environment and granting of incentives. Capacity building is essential in realizing a value addition sustainable management firm.
- Fish traders and marketers will be trained on packaging and eco-labeling by NaFAA in collaboration with MoC, MoH, and private business institutions during the first two years of the project.
- Establishment of value addition enterprises will be highly encouraged by NaFAA, NIC, commercial banks and other private institutions.
- This project component will cost USD 1,163,478.24 and funding will be negotiated with the International Fund for Agriculture Development.

This component of the project is expected to run through the first three years.

Table 96: Implementation schedule for Component 3

| Component 3: | Activity | - Year | | | | |
|---|--|--------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Promoting value addition through entrepreneurship, fish marketing and trade opportunities | Encourage packaging and develop fish products that add value to fish and fish products | ■ | ■ | ■ | | |
| | Promote eco-labeling to targeted export-oriented fish for commercial value at foreign markets | ■ | ■ | ■ | | |
| | Encourage the establishment of value addition enterprises and build capacity to meet international standards | ■ | ■ | ■ | | |

39.8.4. Component 4: Promoting sustainable investment in fisheries and aquaculture

Prepare and offer investors in fisheries, incentives for identified ventures that are socially and environmentally sustainable;

- Relevant government agencies including NaFAA and MoCI and NIC are to foster investment development agenda; most especially fisheries, which serves as the major source of protein for the citizenry.

Promote the development of credit and micro-credit schemes to encourage investment in fisheries.

- Arrangement with commercial banks relative to micro-credit scheme for fisheries investors including fishermen, fish processors and entrepreneurs will be promoted. All relevant government agencies and private sectors are involved in the process.
- While the first year will be allotted to engagement with investors and preparation stage, promoting sustainable investment in fisheries and aquaculture will commence in the second year and runs throughout the project period as indicated below. The component

will be led by NaFAA in collaboration with CDA/MoA, NIC, commercial banks and private investment companies.

- Fish marketers and traders are the beneficiaries of the component that is expected to cost USD1,163,478.24 and funding would be negotiated with the African Development Bank.

This component of the project is expected to run from year two to five.

Table 97: Implementation schedule for Component 4

| Component 4: | Activity | - Year | | | | |
|---|--|--------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Promoting sustainable investment in fisheries and aquaculture | Prepare and offer investors incentive for identified socially and environmentally sustainable ventures | | | | | |
| | Promote the development of credit and micro-credit schemes | | | | | |

39.8.5. Component 5: Setting up an enabling environment for development of aqua-business for growth of the sector

- Provide financial services and incentives for the promotion of smallholder aquaculture as a business. Financial services and incentives will be provided to smallholders through microfinance, investment loan and other appropriate arrangements.
- Ensure the availability and access to inputs, including fish seed and feed. Improve access to markets for fish products by maintaining standards, market
- Support cost-effective aquaculture extension services to fish farmers in collaboration with the private sector and farmers/industry organization. Extension services for the availability and access to inputs, seed, feed will be structured such that the extension service providers through NaFAA will serve as link between inputs providers and fish farmers.
- Establish aquaculture research and technology development capability for the growth of the aquaculture sector through research center such as CARI/MoA.

Build capacity of the private and public sector institutions to produce and disseminate good quality information on aquaculture for facilitation of sound decision making;

- Promote the safety and quality of the farmed fish products by ensuring the application of safety and control mechanisms such as the statutory hazard analysis critical control point (HACCP) methodology; and
- Seek to target women and the youth in active involvement in fisheries and aquaculture activities for the promotion of the sector through support and empowerment programs.
- It is widely believed that aquaculture development is paramount as it provides an alternate source of protein supply to the population. For for the sub-sector to move from its current embryo stage to a developmental stage, all activities under the above components are required to be implemented to the fullest.
- The component will be implemented by NaFAA in collaboration with local fish farmers, local and international non-government organizations, as well as private investors in aquaculture. The component will run throughout the project period

and funding would be sourced from international partners including the ECOWAS at the cost of USD3,587,391.25.

Table 98: Implementation schedule for Component 5

| Component 5: | Activity | - Year | | | | |
|--|--|--------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Setting up an enabling environment for development of aqua-business for growth of the sector | Provide financial services and incentives for promotion of smallholder aquaculture as a business | | | | | |
| | Ensure the availability and access to inputs, including fish seed and feed as well as credit | | | | | |
| | Improve access to markets for fish products by maintaining standards, market | | | | | |
| | Establish aquaculture research and technology development capability for the growth of the aquaculture sector; | | | | | |
| | Support cost effective aquaculture extension services to fish farmers in collaboration with the private sector and farmers/industry organization | | | | | |
| | Build capacity of the private and public sector institutions to produce and disseminate good quality information on aquaculture | | | | | |
| | Promote the safety and quality of the farmed fish products by ensuring the application of safety and control mechanisms such as the statutory hazard analysis critical control point | | | | | |
| | Seek to target women and the youth in active involvement in aquaculture activities for promotion of the sub-sector | | | | | |

39.8.6. Component 6: Implementing comprehensive human resource development and training as well as advisory programs for the fisheries sector

- Prepare and implement a plan to address the human capacity needs;
- Build capacity for new fisheries enterprises as well as alternative income generation activities;
- Support and implement a fisheries curriculum or syllabus at all stages of formal education.
- Human resource capacity building is eminent in most of the components of the program. For a successful program implementation, the required capacity development for each component cannot be overemphasized.
- The financing of this component is anticipated to be executed by NaFAA in collaboration with the MoA CARI and the UL at the cost of USD1,793,695.65 and will commence in the first year and run through the third year of the project period affecting each of the components that has capacity development. Funding for this component would be arranged with the GoL.

Table 99: Implementation schedule for Component 6

| Component 6: | Activity | - Year | | | | |
|--|--|--------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Implementing comprehensive human resource development and training | Prepare and implement a plan to address the human capacity needs | ■ | ■ | ■ | | |
| | Build capacity for new fisheries enterprise and alternative income generation activities | ■ | ■ | ■ | | |
| | Support and implement a fisheries curriculum or syllabus at all stages of formal education | ■ | ■ | ■ | | |

39.9. Strategic Intervention:

The main strategic intervention of the fisheries and aquaculture value chain program is to develop the capacity of women and the youth to increase employment opportunities and create sustainable entrepreneurship including:

- Providing adequate support to the women and youth in setting up fish farms to improve production and productivity;
- Providing support to women and youth with fish inputs and subsequently integrating them into the value chain to improve their livelihoods;
- Development and distribution of fish processing kits including solar ovens for drying and charcoal ovens for smoking;
- Support for the integration of young people and women through the development of a marketing and sales plan for products including packaging, labeling, access to local and regional markets; and
- Strengthening the integration of women and youth in the distribution chain for fish and aquaculture in urban areas would be highly considered;
- Development of entrepreneurial capacity to equip the women and youth with the skill to manage their micro-businesses; and
- Improving the women's and youth's access to finance and financial services.

39.10. EXPECTED RESULTS

The expected results of the program are focused on five main interventions including training and human resource capacity development; aquaculture development; promoting safety and quality standards of fish; reduction in post-harvest losses; as well as investment promotion.

Human resource development to improve the employment and sustainable entrepreneurship of women and youth in the agricultural value chain plays a vital role in the advancement of the nation, especially in the fisheries sector. Training and capacity development relative to data collection and fisheries enterprise development is an expected result of the program. About 7,200 processors constituting 40% of the current population are expected to be trained in various aspects of value-chain. Women and youth play vital roles in the fisheries sector and it is expected that women inequality and youth unemployment will be reduced by supporting

women organizations and including women in the decision-making process as well as providing job opportunities for the unemployed youths.

Aquaculture is expected to shift from the current embryo stage to a development stage through technical support to fish farmers whose activities would improve the fish culture value chain. It is expected that the number of fish farmers will increase by 40% annually from the current figure of 300 farmers to 1050 farmers or more during the program phase. The number of ponds is expected to increase from 1,704 to 2,907 while the number of hectares increases from 160 to 274. With the increased number of fish farmers, the numbers of fish traders and marketers are indirectly increased. Also, the availability of fingerling, fish seed and fish feed are expected to be all-year round. Data collection on aquaculture is also expected to improve.

Consumers are the final players of the value chain. As such, food safety and quality standard are expected to improve and commercial value of fish is enhanced. Eco-labeling and certification of export-oriented fish is promoted for subsequent foreign exchange earnings. It is expected that within the program period, the value on the number of fish products labeled and certified to meet export standard will increase by 40% indicating additional USD1,433,396 to the 2020 value of USD3, 583,490; thus, aggregating export value to USD5,016,886.

One of the expected results is the reduction in post-harvest losses which exponentially increases fish production and subsequently increases income generation. Provision of fish landing cluster infrastructure, fishing and processing equipment are expected to aid the process. The percentage of post-harvest loss is expected to reduce from 40% to 10% by the close of the program phase. While it is expected that the number of fishermen will increase from 13,000 to 18,200, and the number of processors increase from 18,000 to 25,200; both indicating a 40% increase. It is equally expected that the volume of marine fisheries production will increase by 40% from approximately 28,000 metric tons to 35,200 metric tons approximately.

Access to micro-credit is non-existence in the fisheries sector; therefore, it is expected that the program will create an enabling environment for fishermen, processors, fish farmers gain access to a micro-credit scheme; thus providing economic empowerment through financial support. The number of beneficiaries of the scheme including women and the youths is expected to cover over 20% of the sector’s major players.

39.11. BUDGET OF THE VALUE CHAIN PROGRAM

The budget for the project has been divided over five years by result area as indicated in the tables below:

Table 100: Budget and activities for the fisheries and aquaculture value chain development

| | | Activity Budget | | | | | |
|--|--|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|
| Component | Activity | Year 1 | Year 2 | Cost/Year (USD) | | | Total Cost (USD) |
| Improving economic return through establishment of post-harvest structure | Establish fish landing cluster in at least two additional counties including Montserrat County and Grand Bassa County | 1,260,434.78 | 1,260,434.78 | - | - | - | 2,520,869.56 |
| | Support the artisanal fisheries to increase the value of fish by provision of facilities for ice storage on board artisanal craft | - | 121,195.65 | 121,195.65 | 121,195.65 | 121,195.65 | 484,782.60 |
| | Support the fish processors by provision of modern fish drying equipment | - | 121,195.65 | 121,195.65 | 121,195.65 | 121,195.65 | 484,782.60 |
| Sub Total | | 1,260,435 | 1,502,826 | 242,391 | 242,391 | 242,391 | 3,490,434.76 |
| Supporting national safety and quality assurance systems to enhance safety and quality of fish | Adopt, sensitize and implement a capacity building on Hazard Analysis of Critical Points (HACCP) and Total Quality Management (TQM) | 242,391.30 | 242,391.30 | - | - | - | 484,782.60 |
| | Enhance the capacity of the SIF/AA for adoption of the Codex Alimentarius for fish standard, inspections and quality control of fish and fish products | 290,869.57 | 290,869.57 | - | - | - | 581,739.14 |
| Sub Total | | 533,261 | 533,261 | - | - | - | 1,066,521.74 |
| Promoting value addition through entrepreneurship, fish marketing and trade opportunities | Encourage packaging and develop fish products that add value to fish and fish products | 242,391.30 | 242,391.30 | 242,391.30 | - | - | 727,173.90 |
| | Promote eco-labeling to targeted export oriented fish for commercial value at foreign markets | 96,956.52 | 96,956.52 | 96,956.52 | - | - | 290,869.56 |
| | Encourage the establishment of value addition enterprises and build capacity to meet international standards | 48,478.26 | 48,478.26 | 48,478.26 | - | - | 145,434.78 |
| Sub Total | | 387,826 | 387,826 | 387,826 | - | - | 1,163,478.24 |
| Promoting sustainable investment in fisheries and aquaculture | Prepare and offer investors incentive for identified socially and environmentally sustainable sectors | - | 48,478.26 | 48,478.26 | 48,478.26 | 48,478.26 | 193,913.04 |
| | Promote the development of | - | 242,391.30 | 242,391.30 | 242,391.30 | 242,391.30 | 969,565.20 |
| Sub Total | | - | 290,870 | 290,870 | 290,870 | 290,870 | 1,163,478.24 |
| Setting up an enabling environment for development of aqua-business for growth of the sector | Provide financial services and incentives for promotion of smallholder aquaculture as a business | 121,195.65 | 121,195.65 | 121,195.65 | 121,195.65 | 121,195.65 | 605,978.25 |
| | Ensure the availability and access to inputs, including fish seed and feed as well as credit | 121,195.65 | 121,195.65 | 121,195.65 | 121,195.65 | 121,195.65 | 605,978.25 |
| | Improve access to markets for fish products by maintaining standards, market | 48,478.26 | 48,478.26 | 48,478.26 | 48,478.26 | 48,478.26 | 242,391.30 |
| | Establish aquaculture research and technology development capability for the growth of the aquaculture sector | 96,956.52 | 96,956.52 | 96,956.52 | 96,956.52 | 96,956.52 | 484,782.60 |
| | Support cost effective aquaculture extension services to fish farmers in collaboration with the private sector and farmers/industry organization | 145,434.78 | 145,434.78 | 145,434.78 | 145,434.78 | 145,434.78 | 727,173.90 |
| | Build capacity of the private and public sector institutions to produce and disseminate good quality information on aquaculture | 87260.87 | 87260.87 | 87260.87 | 87260.87 | 87260.87 | 436304.35 |
| | Promote the safety and quality of the farmed fish products by ensuring the application of safety and control mechanisms such as the statutory hazard analysis critical control point | 96,956.52 | 96,956.52 | 96,956.52 | 96,956.52 | 96,956.52 | 484,782.60 |
| Sub Total | | 717,478.25 | 717,478.25 | 717,478.25 | 717,478.25 | 717,478.25 | 3,587,391.25 |
| Implementing comprehensive human resource development and training | Prepare and implement a plan to address the human capacity needs | 48478.26 | 48478.26 | 48478.26 | - | - | 145,434.78 |
| | Build capacity for new fisheries enterprise and alternative income generation activities | 96,956.52 | 96,956.52 | 96,956.52 | 0 | 0 | 290,869.56 |
| Support and implement a fisheries curriculum or syllabus at all stages of formal education | | 452,463.77 | 452,463.77 | 452,463.77 | 0 | 0 | 1,357,391.31 |
| | | | | | | | |
| Sub Total | | 597898.55 | 597898.55 | 597898.55 | 0 | 0 | 1,793,695.65 |
| Grand Total | | 3,496,899 | 4,030,159 | 2,236,464 | 1,250,739 | 1,250,739 | 12,265,000 |

Table 101: Cost items

| | | Cost Items | | | | | | | | | | | |
|------------------------------|-------|---------------|----|----|----|----|-----------------|-------------------|------------------|------------------|------------------|------------------|-------------------|
| Purchases | Unit | Quantity/Year | | | | | Unit cost (USD) | Cost per Year/USD | | | | | Total Cost (USD) |
| | | Y1 | Y2 | Y3 | Y4 | Y5 | | Y1 | Y2 | Y3 | Y4 | Y5 | |
| Infrastructure | Unit | 2 | 2 | 2 | 2 | 2 | 484,783 | 969,565 | 969,565 | 969,565 | 969,565 | 969,565 | 4,847,826 |
| Communication | Unit | 6 | 6 | 6 | 6 | 6 | 4,848 | 29,087 | 29,087 | 29,087 | 29,087 | 29,087 | 145,435 |
| Equipment | Unit | 6 | 6 | 6 | 6 | 6 | 48,478 | 290,870 | 290,870 | 290,870 | 290,870 | 290,870 | 1,454,348 |
| Data Collection | Unit | 3 | 3 | 3 | 3 | 3 | 19,391 | 58,174 | 58,174 | 58,174 | 58,174 | 58,174 | 290,870 |
| International Consultant | Month | 6 | 6 | 6 | 6 | 6 | 96,957 | 581,739.12 | 581,739.12 | 581,739.12 | 581,739.12 | 581,739.12 | 2,908,695.60 |
| National Co | Month | 6 | 6 | 6 | 6 | 6 | 33,935 | 203,608.68 | 203,608.68 | 203,608.68 | 203,608.68 | 203,608.68 | 1,018,043.40 |
| Local Facilitator/Contractor | Month | 6 | 6 | 6 | 6 | 6 | 9,696 | 58,174 | 58,174 | 58,174 | 58,174 | 58,174 | 290,870 |
| Training | Unit | 5 | 5 | 5 | 5 | 5 | 29,087 | 145,435 | 145,435 | 145,435 | 145,435 | 145,435 | 727,174 |
| Transportation | Unit | 6 | 6 | 6 | 6 | 6 | 9,696 | 58,174 | 58,174 | 58,174 | 58,174 | 58,174 | 290,870 |
| Support to Program | Unit | 6 | 6 | 6 | 6 | 6 | 9,696 | 58,174 | 58,174 | 58,174 | 58,174 | 58,174 | 290,870 |
| Total | | | | | | | | 2,453,000 | 2,453,000 | 2,453,000 | 2,453,000 | 2,453,000 | 12,265,000 |

Table 102: Budget summary

| Summary Budget | | | | | | |
|--------------------------------------|------------------|------------------|------------------|------------------|------------------|-------------------|
| Result Area | Year/USD | | | | | Total (USD) |
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | |
| Post harvest infrastructure improved | 1,260,435 | 1,502,826 | 242,391 | 242,391 | 242,391 | 3,490,435 |
| Safety and quality assurance systems | 533,261 | 533,261 | - | - | - | 1,066,522 |
| Entrepreneurship | 387,826 | 387,826 | 387,826 | - | - | 1,163,478 |
| Investment | - | 290,870 | 290,870 | 290,870 | 290,870 | 1,163,478 |
| Aquaculture | 717,478 | 717,478 | 717,478 | 717,478 | 717,478 | 3,587,391 |
| Capacity Development | 597,899 | 597,899 | 597,899 | - | - | 1,793,696 |
| TOTAL | 3,496,899 | 4,030,159 | 2,236,464 | 1,250,739 | 1,250,739 | 12,265,000 |

39.12. The Financial Plan

Table 103: Financial plan

| Financial Plan | | | |
|--|-------------------|--|-------------------|
| Source of Fund | Amount (USD) | Use of Fund | Amount (USD) |
| Institution | Amount (USD) | Activity | Amount (USD) |
| The World Bank | 3,490,434.76 | Post-harvest Infrastructure | 3,490,434.76 |
| The European Union | 1,066,521.74 | Safety and Quality Assurance System | 1,066,522 |
| International Fund for Agriculture Development (IFAD) | 1,163,478.24 | Value-Added Promotion through Entrepreneurship, Trade and Market | 1,163,478 |
| The African Development Bank (AfDB) | 1,163,478.24 | Investment in Fisheries and Aquaculture | 1,163,478 |
| The Economic Community of West African States | 3,587,391.25 | Aqua-business Development | 3,587,391 |
| The Government of Liberia/National Fisheries and Aquaculture Authority | 1,793,695.65 | Human Resource Capacity Development | 1,793,696 |
| Total | 12,265,000 | | 12,265,000 |

39.13. THE IMPLEMENTATION ARRANGEMENTS PLAN

NaFAA, as the leading agency, will implement the program and the implementation arrangement plans consider the establishment of a project steering team comprising other government institutions and private partners as well as experts who will provide professional services in the execution of the program. In order to ensure a successful program implementation, a financial system that will ensure proper procurement and tendering processes as well as allocation of funds are strictly adhered to. A guiding process that will ensure the empowerment of stakeholders and beneficiaries alike is instituted coupled with the development of an effective and sustainable program result. Measurement of program performance measures will be instituted through proper monitoring and evaluation.

Various government institutions, international and local non-governmental organizations, fisheries co-management associations, fishermen associations, private institutions, and entrepreneurs have roles to play in the implementation of the program as indicated in the matrix below. It is noteworthy to note that the institutions are not arranged alphabetically but first as public entity with the most relevance to fisheries and second, the private institutions.

Table 104: Implementation plan for fisheries and aquaculture value chain

| Institution | Type | Functions/Implementation Role |
|--|---------------------------------------|--|
| The National Fisheries and Aquaculture Authority (NaFAA) | Government | Regulating body for fisheries and aquaculture. Plays lead role in the implementation of the value chain project House the management team of project |
| Ministry of Agriculture | Government | Issues quarantine certificates to fish import/export. Works collaboratively with NaFAA on extension works. |
| Ministry of Health (Competent Authority) | Government | Serves as the competent authority relative to fish safety, Works collaboratively with leading agency. |
| Ministry of Commerce and Industry | Government | The government agency responsible for commerce, trade and marketing of fish products. Issues import permit/export permit declarations. Works in collaboration with NaFAA |
| Centre for Agriculture Research Institute/MOA | Government (semi - autonomous agency) | Conducts fisheries research and technology development in collaboration with NaFAA as relate to value chain |
| Cooperative Development Agency/MOA | Government (semi-autonomous agency) | Collaborates with NaFAA on fisheries cooperative issues. Works with fisheries associations in conjunction with NaFAA |
| Ministry of Finance and Development Planning | Government | Provides tax and incentives laws on fisheries revenues as return on foreign earnings, GST on import and export fisheries products are captured by MFDP |
| Ministry of Gender and Women Empowerment | Government | Relates with NaFAA on women affairs as relate to fisheries value chain project implementation |
| Ministry of Youth and Sports | Government | Collaborate with NaFAA on issues affecting the youth in the value chain |

| | | |
|--|--|---|
| Ministry of Education | Government | Develops syllabus and curriculum guide as relate to providing fisheries education to stakeholders . Works with vocational training centers in providing hands-on practical training to fish farmers |
| Environment Protection Agency (EPA) | Government | Collaborates with NaFAA in ensuring the fisheries environment is most suitable to promote value chain |
| Commercial Bank/Financial Institution | Private | Provides micro-credit scheme for fisheries investment |
| CMA | Community-based Fisheries Management Body | Collaborates with NaFAA in the value chain program |
| LAFA | Fisheries Pressure Group | Works along with relevant government agencies in securing the welfare, interest and safety of fishermen considering that fishing is one of the most dangerous jobs on earth. |
| National Fish Farmers Association of Liberia | Aquaculture Organization | Collaborates with NaFAA in the implementation of program with focus on fish farmers. |
| Non-Governmental Organizations | Local and International non-profit fisheries-based organizations | Provides back-stopping for the program |

39.14. RAPID COST-BENEFIT ANALYSIS

Table 105: Cost-benefit analysis

| Quantitative Costs | | | | | | |
|------------------------------------|------------------|------------------|------------------|------------------|------------------|-------------------|
| Indirect Costs | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
| Infrastructure | 969,565 | 969,565 | 969,565 | 969,565 | 969,565 | 4,847,826 |
| Equipment | 290,870 | 290,870 | 290,870 | 290,870 | 290,870 | 1,454,348 |
| Data Collection | 58,174 | 58,174 | 58,174 | 58,174 | 58,174 | 290,870 |
| International Consultant | | | | | | |
| | 581,739 | 581,739 | 581,739 | 581,739 | 581,739 | 2,908,696 |
| National Consultant | | | | | | |
| | 203,609 | 203,609 | 203,609 | 203,609 | 203,609 | 1,018,043 |
| Local Contractor/Facilitator | | | | | | |
| | 58,174 | 58,174 | 58,174 | 58,174 | 58,174 | 290,870 |
| Training | 145,435 | 145,435 | 145,435 | 145,435 | 145,435 | 727,174 |
| Support to Program | | | | | | |
| | 58,174 | 58,174 | 58,174 | 58,174 | 58,174 | 290,870 |
| Total | 2,365,739 | 2,365,739 | 2,365,739 | 2,365,739 | 2,365,739 | 11,828,695 |
| Utilities | | | | | | |
| Communication | 29,087 | 29,087 | 29,087 | 29,087 | 29,087 | 145,435 |
| Transportation | 58,174 | 58,174 | 58,174 | 58,174 | 58,174 | 290,870 |
| Total | 87,261 | 87,261 | 87,261 | 87,261 | 87,261 | 436,304 |
| Intangible Costs: | | | | | | |
| Production level | - | - | - | - | - | - |
| Consumers satisfaction | - | - | - | - | - | - |
| Total | - | - | - | - | - | - |
| Opportunity Cost: | | | | | | |
| Neglecting one project for another | - | - | - | - | - | - |
| Total | - | - | - | - | - | - |
| Overall Costs | 2,453,000 | 2,453,000 | 2,453,000 | 2,453,000 | 2,453,000 | 12,265,000 |
| Quantitative Benefits | | | | | | |
| Direct Benefits: | | | | | | |
| Increased Revenue | 1,962,400 | 1,962,400 | 1,962,400 | 1,962,400 | 1,962,400 | 9,812,000 |
| New Sales | 1,569,920 | 1,569,920 | 1,569,920 | 1,569,920 | 1,569,920 | 7,849,600 |
| Total | 3,532,320 | 3,532,320 | 3,532,320 | 3,532,320 | 3,532,320 | 17,661,600 |
| Indirect Benefits: | | | | | | |
| Increased Customers Interest | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 6,279,680 |
| Total | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 6,279,680 |
| Intangible Benefits: | | | | | | |
| Improved Business Morale | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 6,279,680 |
| Total | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 6,279,680 |
| Competitive Benefits: | | | | | | |
| First Product to Market | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 6,279,680 |
| Total | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 1,255,936 | 6,279,680 |
| Overall Benefits | 7,300,128 | 7,300,128 | 7,300,128 | 7,300,128 | 7,300,128 | 36,500,639 |
| NPV | | | | | | |
| ROI | | | | | | |
| PERCENTAGE RATIO | | | | | | 33.60 |

39.15. RESULTS FRAMEWORK

Table 106: Result framework for the fisheries and aquaculture value chain

| Development objective | Indicators | | | | Means of verification | Hypothesis |
|--|--|--|--|--|---|---|
| | Indicators | Baseline value | Mid line value | Endline value | | |
| Economic development of fisheries and aquaculture value chain focusing on strengthening the institutional food safety capacity and enhancement of post-harvest capacity; and upgrading of post-harvest fisheries business through capacity building, food safety system implementation, matching investment support and providing business support mechanism | <p>1) Investment opportunity in fisheries increases by 40% as a result of business support</p> <p>2) Fisheries sector contribution to GDP to increase by 40 % by the end of program</p> <p>3) More than 40% of registered fishers and processors earning above USD 1,000 per year by the end of program</p> <p>4) Employment in the sector increased by 40% due to</p> | <p>20 Investors</p> <p>3%</p> <p>33000 fishermen</p> <p>18000 Processors</p> | <p>24 Investors</p> <p>3.3%</p> <p>36,300 fishermen</p> <p>25,200 processors</p> | <p>28 Investors</p> <p>3.6%</p> <p>39,600 fishermen</p> <p>25,200 processors</p> | <p>Fisheries Livelihood Survey, National Statistics, UN Reports</p> <p>NaFAA Annual Report,</p> <p>Business Gazette</p> | <p>1) Unpredictable events such as food poisoning, climate change, environmental pollution and other natural disasters that disrupt business environment.</p> <p>2) Political unrest</p> <p>3) Lack of political will or change of government</p> |

| | | | | | | |
|--|---|--|---|---|--|--|
| | growth of the value chain by the end of the fifth year | | | | | |
| Specific Objective 1: | | | | | | |
| Improving economic returns through establishment of post-harvest infrastructures | 20% increase in percentage of value added benefit from the fisheries and aquaculture sector | 45% | 50% | 56% | NaFAA Annual Report Project Report Report from other sources | Land acquisition challenges Challenges in building in building outside the capital city |
| Results | | | | | | |
| 1) Fish landing cluster established in at least two additional counties including Grand Bassa County and Montserrdo County/Maryl and to enhance the earnings from the industrial and artisanal fisheries | Two fish landing site clusters established in at least two addition major landing sites | Two existing in (Robertsp ort, Grandces s) | Three construc ted (Existin g two plus another on in Buchana n) | Four constructed (Exiting three plus another one in Monrovia/Har per) | NaFAA Annual Report Project Report Report from other sources | Land acquisition challenges Challenges in building in building outside the capital city |
| 2) Support the Value of artisanal | 80% of artisanal fishers | Less than 10% has | 40% to have access to | 80% to have access to ice | NaFAA Annual Report | High probability of mishandling |

| | | | | | | |
|--|---|---|---|---|--|--|
| fisheries to increased by provision of facilities for ice storage on board artisanal craft | have access to ice by the end of program | access to ice | ice by mid-program period | by end of program | Project Report Report from other sources | the insulation boxes |
| 3)Fish drying equipment provided to support the fish processors | About 80% fish processors have conventional fish drying equipment | About 18,000 fish processors to have conventional fish drying equipment | 21,600 fish processors to have modern fish drying equipment | Approximately 25,200 fish processors to have modern fish drying equipment | NaFAA Annual Report Project Report Report from other sources | Challenges with women adapting to the new modern fish drying equipment |

Specific Objective 2:

| | | | | | | |
|--|---|-------------------------|--------------------------|-------------------------------------|-------------------------------------|--|
| Supporting national safety and quality assurance systems to enhance safety and quality of fish | One Support National Food Safety Authority and a Reference Quality Control Laboratory prepared by year two. | 0 (Not yet established) | 1 Laboratory established | 1 Laboratory established maintained | NaFAA Report Report from MoH | Process of joint collaboration may delay establishment process |
|--|---|-------------------------|--------------------------|-------------------------------------|-------------------------------------|--|

Results:

| | | | | | | |
|--|---|---------------------------------|------------------------|-------------------------------------|---|--|
| Adoption of HACCP and TQM, Codex Alimentarius principles | 100% Support the process of establishing a competent laboratory unit which is ongoing through NaFAA | Adoption of principle commenced | 50% coverage by year 2 | 100% coverage by the end of program | NaFAA Report MoH Report Other Reports | Collaboration between agencies may further delay the process |
|--|---|---------------------------------|------------------------|-------------------------------------|---|--|

Specific Object 3:

| | | | | | | |
|---|---|---|--|--|--|---|
| Promoting value addition through entrepreneurship, fish marketing and trade opportunities | An assessment of needs and opportunities and a development plan for post-harvest and trade improvement developed by the first year of the program. 0% developed | Complementary studies to support the specific objective of the program to be executed at 0% level | Support to the specific objective of the program supported up to 50% level | 100% support executed to the implementation of the program under the specific objective | NaFAA Report MoH Report MoCI Other Reports | Collaboration between agencies may further delay the process |
| Results: | | | | | | |
| Packaging and develop fish products encouraged | At least three (3) Packing industries established and over 18,000 fish processor gain knowledge on packaging | None (0) packaging industry in the country as yet | 50% industry and fish processors involved in fish packaging | 100% of proposed number of fish packaging industry fully established and 100% women fish processors knowledgeable and involved in fish packaging | NaFAA Report Un Agencies Report Other reports | Confrontation between micro investors and macro investors may occur Private companies may not want to adopt the system |
| Eco-labeling of targeted export oriented fish promoted | Export volume of fish increased from current level by 40% | USD3,583,490 export value | Export volume to increase by 20% | Export volume to increase by 40% | Reports from NaFAA, the UN Agencies and other institutions | Increase in volume may be hindered by high tax regime and unfriendly business environment |
| Establishment of value addition enterprises encouraged | Number of enterprise engaged in fish value addition increased from current | 15 cold storages companies in Liberia with over 75 branches | Number of establishments increased by 20% | Number of establishment increased by 40% | Reports from NaFAA, the UN Agencies and other institutions | Increase in number of established enterprise may be hindered by high tax regime and unfriendly |

| | | | | | | |
|--|---|--|--|---|---|---|
| | level by 40% | | | | | business environment |
| Specific Objective 4: | | | | | | |
| Promoting sustainable investment in fisheries and aquaculture | Investment in fisheries and aquaculture opportunities created | Number of opportunities identified to increase by 40% | Number of opportunities increased by 20% of the 40% realized | 40% investment opportunities fully promoted | Reports from NaFAA, NIC and other sources | Unfriendly business environment with political and socio-economic hurdles may hinder investment opportunities |
| Results: | | | | | | |
| Micro-credit schemes to encourage investment in fisheries and aquaculture developed and promoted | Micro-credit scheme created to boost investment | No micro-credit scheme for fisheries investors | 20% of fisheries investors to benefit from micro-credit scheme | 40% of fisheries investors to benefit from micro-credit scheme | Reports from NaFAA, NIC, commercial banks and other sources | Bureaucratic micro-credit scheme may discourage investors |
| Specific Objective 5: | | | | | | |
| Promoting sustainable fisheries investment; Setting up an enabling environment for development of aqua-business for growth of the sector | Number of 1,704 existing ponds to be increased, and the average in-use land of 73.3 hectares to be expanded with the average pond size measured at 464 m ² increased | Number of ponds, land use and pond size increase from the current status | Number of ponds, land use and pond size increase by approximately 40%. Number of ponds increased from 1,704 to 2,385 and number of hectare increased from 160 to 224 | Number of ponds, land use and pond size increase by approximately 70% Number of ponds increased from 1,704 to 2,907 and number of hectare increased from 160 to 274 | Reports from NaFAA, MoA, UN Agencies, NGOs, | Political will couple will unfavorable environmental, economic and social factors may hinder the development of aquaculture |
| Results: | | | | | | |

| | | | | | | |
|--|--|---|--|--|---|---|
| Provide financial services and incentives for promotion of smallholder aquaculture as a business; | Number of small holder fish farmers increased from 300 by 40% annually and incentives provided to fish farmers | 300 fish farmers increased annually by 40% | Number of fish farmers increased by 40% from 300 to 520 fish farmers | Number of fish farmers increased by 40% from 300 to 1050 fish farmers during program phase | Reports from NaFAA, MoA, CARI, UN Agencies, NGOs, commercial banks and other aquaculture related institutions | Political will couple will unfavorable environmental , economic and social factors may hinder promotion of aquaculture smallholders |
| Ensure the availability and access to inputs, including fish seed and feed | Number of inputs, fish feed and seed increased to enhance the current production of 40 mt. | Production output as a result of input, fish feed and seed is 40 mt | Production to increase up to 40% amounting to 56 mt. | Production to increase up to 80% amounting to 72 mt. | Reports from NaFAA, MoA, CARI, UN Agencies, NGOs, and other aquaculture related institutions | Political will couple will unfavorable environmental , economic and social factors may hinder aquaculture production |
| Establish aquaculture research and technology development capability for the growth of the aquaculture sector; | Aquaculture center for excellence in aquaculture research and development to be established in to buttress the works of MoA/CARI | One aquaculture center of excellence to be established | Establishment of an aquaculture center of excellence is 50% complete | Aquaculture center of excellence established 100% | Reports from NaFAA, MoA, CARI, UN Agencies, NGOs, and other aquaculture related institutions | Political will and lack of funding may hinder the establishment of aquaculture center of excellence |
| Seek to target women and the youth in active involvement in aquaculture | Database established to indicate the | Number of women and youth involved in | Number of women and youth | Number of women and youth involved in aquaculture | Reports from NaFAA, MoA, CARI, | Lack of support and non-enthusiasm on the part of |

| | | | | | | |
|---|---|--------------------------------|---|---------------------|---|---|
| activities for promotion of the sub-sector. | number of women and youth involved in aquaculture and to study the trend of their involvement at an increasing rate | aquaculture to increase by 80% | involved in aquaculture increased up to 40% | increased up to 80% | UN Agencies, NGOs, and other aquaculture related institutions | women and youth may reduce the number of women and youth involvement in aquaculture development |
|---|---|--------------------------------|---|---------------------|---|---|

Specific Objective 6:

| | | | | | | |
|--|--|--|---|---|--|--|
| Implementing comprehensive human resource development and training as well as advisory programs for the fisheries sector | Human resource capacity development identified at every component of the value chain | Number of fisheries and aquaculture stakeholders trained value chains to increase by 80% | Number of trained fisheries and aquaculture stakeholder increased up to 40% | Number of trained fisheries and aquaculture stakeholder increased up to 40% | Reports from NaFAA, MoA, CARI, UN Agencies, NGOs, and other aquaculture related institutions | Lack of willingness and lack of funding to support training could serve as hindrance to fisheries and aquaculture human resource development |
|--|--|--|---|---|--|--|

Results:

| | | | | | | |
|---|---|--|--|--|--|--|
| Plan to address the human capacity needs relative to the other five specific objectives outline above is prepared and implemented | Human resource capacity needs identified in the components of the value chain program to be fully implemented | The capacity building of 80% of the stakeholders involved in the other five components are developed | Number of stakeholders trained increased up to 40% | Number of stakeholders trained increased up to 80% | Reports from NaFAA, MoA, CARI, UN Agencies, NGOs, and other aquaculture related institutions | Lack of willingness and lack of funding to support training could serve as hindrance to fisheries and aquaculture human resource development |
|---|---|--|--|--|--|--|

| | | | | | | |
|---|---|--|--|---|--|---|
| Fisheries curriculum or syllabus at all stages of formal education is | Number of institutions offering fisheries and aquaculture courses | Number of students enrolled in fisheries and | Number increased up to 40% of initial registered | Number increased up to 80% of initial registered students | University of Liberia /Department of Fisheries and | Number of interested students may reduce due to lack of personal interest, lack |
|---|---|--|--|---|--|---|

| | | | | | | |
|---------------------------|---|--|------------|--|----------------------------------|---|
| developed and implemented | increased from one tertiary institution to additional three and the involvement of high schools and vocational training centers | aquaculture studies increased from current figure of 109 ⁵² | d students | | Aquaculture Sciences (UL/DoF AS) | of support to the College and political unrest that may disrupt educational activities. |
|---------------------------|---|--|------------|--|----------------------------------|---|

39.16. EXPECTED RESULTS

- Number of fish farmers increased by 40% annually from the current figure of 300 fish farmers to 1050 farmers or more during the program phase;
- Number of ponds increased from 1,704 to 2,907 while the number of hectares increased from 160 to 274;
- Increased number of fishermen from 33,000 to 38,200;
- Increased number of fish processors from 18,000 to 25,000
- Marine fisheries production increased by 40% from approximately 28,000 metric tons to about 35,200 metric tons approximately;
- Increased by 40% number of fish products labeled and certified to meet export standard;
- Reduced percentage of post-harvest loss from 40% to 10%.
- Capacity of women and youth developed from its current status by 20% to improve employment and sustainable entrepreneurship.

⁵² University of Liberia, Department of Fisheries and Aquaculture Sciences, Department Students' Enrollment List, 2024

39.17. ANNEX 1: PROGRAM COMPONENTS

| Specific Objective | Activities | Descriptive Actions | Intervention Implementation | | | | |
|--|--|---|--|--------------------------|---|---|------|
| | | | Responsible Party | Duration of Intervention | Location of Activities | Beneficiaries | Cost |
| Improving economic returns through establishment of post-harvest infrastructure | Establish fish landing cluster in at least two additional counties including Montserrado County and Grand Bassa County to enhance the earnings from the industrial and artisanal fisheries | Fish landing clusters would be established and Investment on infrastructures would be sourced by the GoL through NaFAA replicating the Robertsport cluster. | NaFAA, | 2024 - 2028 | Montserrado County and Grand Bassa County | Fishermen, fish processors, fish traders, other fisheries stakeholder | |
| | Support the artisanal fisheries to increase the value of fish by provision of facilities for ice storage on board artisanal craft | Every registered and licensed fishing boat operator would be issued insulated box of dimension | NaFAA, Co-Management Association (CMA) and the Liberia Artisanal Fishermen | 2024 – 2028 | Fish landing sites/communities throughout the country | Registered and licensed artisanal fishing canoe operators | |

| | | | | | | | |
|--|--|---|-----------------------|-------------|---|--|--|
| | | commensurable with the size of the boat. Fishermen would be trained in storage and packing and handling method | Association (LAFA) | | | | |
| | Support the fish processors by provision of modern fish drying equipment | Modern fish drying equipment would be provided to registered and recognized fish processors. Fish processors (women) would be trained in fish handling and processing | NaFAA, CMA/Women Wing | 2024 – 2026 | Fish landing sites/communities throughout the country | Registered members of fish processors belonging to the women wing of CMA | |
| | | | | | | | |

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|---|---|--|---|-------------|---|---|--|
| Establishing national safety and quality assurance systems to enhance safety and quality of fish | Adopt, sensitize and implement a capacity building on Hazard Analysis of Critical Points (HACCP) and Total Quality Management (TQM); | Qualified and competent personnel to be trained on HACCP and TQM | NaFAA, Ministry of Health (MoH), Ministry of Agriculture (MoA) Ministry of Commerce and Industry (MoCI), | 2024-2025 | Fisheries Competent Laboratory | Qualified and competent staff of NaFAA, MoH, MoA and MoCI | |
| | Enhance the capacity of the NaFAA for adoption of the Codex Alimentarius for fish standard, inspections and quality control of fish and fish products | Qualified and competent staff to be trained in fish standard inspection, quality control of fish and fish products | NaFAA, Ministry of Health (MoH), Ministry of Agriculture (MoA), Ministry of Commerce and Industry (MoCI), | 2024-2025 | Fisheries Competent Laboratory | Qualified and competent staff of NaFAA, MoH, MoA and MoCI | |
| | | | | | | | |
| Promoting value addition through entrepreneurship, fish marketing | Encourage packaging and develop fish products that add value to | Fisheries value-addition to be encouraged | NaFAA, MoCI, | 2024 – 2025 | Business enterprise stationed in coastal capital cities | Entrepreneurs, fish processors, traders and marketers | |

| | | | | | | | |
|--------------------------------|--|--|--|-------------|---|--|--|
| and trade opportunities | fish and fish products | including canning, filleting | | | including Monrovia, Buchanan and Harper | | |
| | Promote eco-labeling of targeted export-oriented fish to enhance the commercial value at international markets; and certification of fish products for export market | Fish eco-labeling and certification as a “Product of Liberia” to be promoted in order to enhance revenue generation, foreign exchange earnings, job creation and boost food security | NaFAA, MoCI, MoH, NIC, Ministry of Labor (MoL) | 2024 - 2028 | Business enterprise stationed in coastal capital cities including Monrovia, Buchanan and Harper | Business enterprise, consumers, men, women and youth | |
| | Encourage the establishment of value addition enterprises and build capacity to meet international standards | Value addition in every stage of fisheries production to be encouraged and train stakeholder with respect | NaFAA, MoCI, NIC | 2024 - 2028 | Business firm, frozen foods/cold room operators | Local business enterprises | |

| | | | | | | | |
|---|--|---|---|-------------|------------|--|--|
| | | to fish processing and handling | | | | | |
| | | | | | | | |
| Promoting sustainable fisheries investment | Prepare and offer investors in fisheries, incentives for identified ventures that are socially and environmentally sustainable | Investment incentives would be granted to business ventures expressing interest in establishing and promoting fisheries ventures including importers of fishing gears and materials etc., thus creating job opportunity for the economy | NaFAA, MoCI, National Investment Commission (NIC) | 2024 - 2028 | Nationwide | Entrepreneurs; fishers, processors, other fisheries stakeholders including women and youth | |
| | Promote the development of credit and micro-credit | Negotiate with local banks to grant micro- | NaFAA, MoA, Cooperative | 2024 - 2028 | Nationwide | Fishermen, processors, traders, | |

| | | | | | | | |
|---|--|---|--|-------------|-----------------------|-------------------------|--|
| | schemes to encourage investment in fisheries | credit loans to fishermen, processors, traders, importers and exporters | Development Agency (CDA), Commercial Banks | | | importers and exporters | |
| | | | | | | | |
| Setting up an enabling environment for development of aqua-business for growth of the sector | Provide financial services and incentives for promotion of smallholder aquaculture as a business | Negotiate with local banks to grant financial services to fish farmers and the national government to provide incentives to fish farmers in promoting aquaculture | NaFAA, MoA, CDA, Local Commercial Banks | 2024 - 2028 | Fish farms nationwide | Fish farmers | |
| | Ensure the availability and access to inputs, including fish seed and feed | Inputs including fish seed and fish feed are made available. Also, credit | NaFAA, MoA, CDA, Local Commercial Banks | 2024 - 2028 | Fish farms nationwide | Fish farmers | |

| | | | | | | | |
|--|---|--|--|-------------|-----------------------|--------------|--|
| | as well as credit | facilities are granted to fish farmers through micro-credit scheme | | | | | |
| | Improve access to markets for fish products by maintaining standards, market data | Fish farmers have improved access from farm to market, maintain standard of fish product during transit, and make data on fish market available as there is limited data on aquaculture products | NaFAA, MoA, CDA | 2024 - 2028 | Fish farms nationwide | Fish farmers | |
| | Establish aquaculture research and technology development capability for | Considering the slow pace of aquaculture growth and developmen | NaFAA, MoA/Centre for Agriculture Research | 2024 - 2028 | Fish farms nationwide | Fish farmers | |

| | | | | | | | |
|--|---|--|-------------------------|-------------|---------------------------|--|--|
| | the growth of the aquaculture sector | t in the country, aquaculture research and technology center need to be established | Institute (CARI) | | | | |
| | Support cost effective aquaculture extension services to fish farmers in collaboration with the private sector and farmers/industry organization | Extension services are provided to fish farmers through collaboration | NasFAA, MoA, CDA, NGOs, | 2024 - 2028 | Fish farms nationwide | Fish farmers | |
| | Build capacity of the private and public sector institutions to produce and disseminate good quality information on aquaculture for facilitation of | Capacity building on information dissemination and sound decision making relative to aquaculture is executed | NaFAA | 2024 - 2026 | Selected sites nationwide | Fish farmers, private and public institution | |

| | | | | | | | |
|--|--|---|---|-------------|--------------------------------|---|--|
| | sound decision making | | | | | | |
| | Promote the safety and quality of the farmed fish products by ensuring the application of safety and control mechanisms such as the statutory hazard analysis critical control point (HACCP) methodology | Qualified and competent staff to be trained in HACCP methodology, fish standard inspection, quality control of fish and fish products | NaFAA, Ministry of Health (MoH), Ministry of Agriculture (MoA), Ministry of Commerce and Industry (MoCI), | 2024-2025 | Fisheries Competent Laboratory | Qualified and competent staff of NaFAA, MoH, MoA and MoCI | |
| | Seek to target women and the youth in active involvement in aquaculture activities for promotion of the sub-sector | Selected women and youth group to be nurtured into aquaculture activities for the sector's growth and development | NaFAA, Ministry of Youth and Sports (MY&S); Ministry of Gender and Women Affairs (MoGWA) | 2024 - 2028 | Nationwide | Women and Youth | |

| Implementing comprehensive human resource development and training as well as advisory programs for the fisheries sector | Prepare and implement a plan to address the human capacity needs | Identify training needs in fisheries value chain investment | NaFAA | 2024 -2026 | Nationwide | Fishermen, fish farmers, fish processors, traders, importers and exporters | |
|---|--|--|---|-------------|------------|--|--|
| | Build capacity for new fisheries enterprises as well as alternative income generation activities | Identify alternative livelihood source of income for fisheries stakeholders and provide the required training | NaFAA | 2024 -2026 | Nationwide | Fishermen, fish farmers, fish processors, traders, importers and exporters | |
| | Support and implement a fisheries and aquaculture curriculum or syllabus at all high schools and vocational institutes | Institutionalize fisheries studies at high school level as college of fisheries and aquaculture sciences had already been established at the University of Liberia | NaFAA, MoA, Ministry of Education (MoE) | 2024 - 2028 | Nationwide | Youth | |

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CHAPTER SIX: CROSS-CUTTING PROGRAMS OF NADP

XL. MECHANIZATION WITH A FOCUS ON THE CREATION OF MECHANIZATION HUBS IN PRODUCTION CLUSTERS FOR BOTH PRODUCTION AND POST-HARVEST HANDLING

40.1. JUSTIFICATION

The agricultural sector in Liberia is plagued by low productivity, a lack of access to modern farming technologies, high postharvest losses, and insufficient infrastructure. In order to overcome these issues and unleash the sector's full potential, it is essential to establish mechanization hubs in areas of high cultivation.

A profitable and sustainable value chain heavily relies on mechanization to modernize agricultural output and provide jobs, particularly for women and young people. It might increase the sustainability and efficiency of the sector, which would generate income. In agricultural areas, creating a network of production clusters and mechanization hubs can boost output, reduce postharvest losses, and enhance the quality of life for farmers.

Crops like rice, cassava, maize, and vegetables are being heavily farmed in Liberia without the use of machinery or appropriate post-harvest management. The government plans to cultivate 20,000 hectares of cassava, 20,000 hectares of maize, and 50,000 hectares of rice during the next five years, along with other cash crops like coffee and cocoa. In order to reach these milestones, mechanization hubs need to be established, where farmers can go to request machinery to continue cultivation operations in order to acquire high yields as a result of farm development and management.

In order to achieve economic returns of the various value chains and address food security, it would be necessary to strengthen and promote mechanization hubs in the sector. This will ensure the sustainability and efficiency in the five years' period of the value chain intervention. The value chain system will become much more profitable leading to strengthening gender mainstreaming, drawing young people into the system, and ensuring a return on investment as income.

40.2. MAIN PRIORITY INVENTIONS

Establishing a mechanization hub in the value chain systems of Liberia requires intervention that promotes sustainability, usability, profitability and public-private partnership.

40.2.1. Country's agricultural production assessment

Help determine the optimal locations for establishing mechanization hubs based on the quantity and efficiency of crop production. For example, a highly productive district, county, or region can profit from the establishment of mechanization hubs to effectively achieve the objectives of several value chains in ha cultivation. Additionally, it will enable the choice of a strategic location for the establishment, taking into account factors such as porosity, accessibility, infrastructure, and market demand requirements.

40.2.2. Strengthen Infrastructure development

To enable more farming communities to utilize it, the Ministry of Agriculture should fortify and broaden the progress it has made in one of its current programs, which encourages the construction of mechanization

hubs. Making the intervention more resilient and sustainable requires constructing and fortifying workshops, storage spaces, and rooms for maintaining machinery and equipment. And establish more needed mechanization hubs in achieving the targeted value chains objectives.

40.2.3. Capacity building and training intervention

Youth and women will be encouraged to work by being trained as technicians to run the mechanization hubs, which will reduce poverty and increase employment opportunities. Both value addition and food security will be supported and encouraged by it. Building the capacity of scientists, technologists, and farmers will improve the sustainability of the hubs and enable it to adequately supply its responsibilities to smallholders. Linking the mechanization hubs with technical training programs like BWI and community colleges in order to provide young people with the skills they need to operate and manage the hubs efficiently. By doing this, the hubs' sustainability would be improved, and Liberia's technical capability deficit in agricultural mechanization will be closed.

40.2.4. Promoting private and public sector partnership

Private and governmental partnerships should underpin the management and operation of the mechanization hubs. This will make it possible for the hubs to function as businesses, bolstering the private sector and drawing in capital. In order to encourage and expand public and private partnerships, the Ministry of Agriculture can take the lead and provide the conditions that are required to uphold justice and openness.

40.2.5. Access to finance intervention

The Ministry of Agriculture should facilitate and finance the construction of mechanization hubs in the key value chain areas, such as rice, cassava, maize, etc., through donor-funded agricultural initiatives. Encouraging and assisting organizations that make finance more accessible throughout value chains. Enabling nearby businesses, farmer unions, cooperatives, and smallholders to collaborate with hubs to fulfill the needs of their members and clients.

40.2.6. Strengthening market linkages and value addition intervention

Create market connections by setting up market aggregation centers at the hubs to help farmers find outlets for their produce. Encourage value-added processing methods as well. For example, establish centers for rice milling machines and cassava processing, where farmers may bring their raw materials to be processed and earn money.

40.3. Expected results:

- Increased productivity: Through the establishment of mechanization hubs, farmers will have access to modern farming technologies that will boost productivity in the agricultural sector. This is anticipated to result in a significant increase in yields per hectare as farmers can cultivate larger areas more efficiently.

- **Reduced postharvest losses:** The establishment of mechanization hubs will help farmers learn and implement effective postharvest management practices, leading to decreased crop losses for rice, cassava, maize, and vegetables. As a result, farmers will be able to make better use of their harvested crops and see a boost in their profits.
- **Improved quality of life for farmers:** Farmers are expected to see a boost in their incomes with increased productivity and reduced losses, which will improve their quality of life. Mechanization hubs will also provide employment opportunities for women and young people, contributing to poverty reduction and economic empowerment in rural communities.
- **Enhanced value chain efficiency:** Creating a network of production clusters and mechanization hubs is key to improving the agriculture value chain. This will help crops reach consumers quicker and in better quality, ultimately boosting profitability in the sector.
- **Strengthened gender mainstreaming and youth involvement:** Automation centers will offer training programs for young people and women to become technicians who can operate and upkeep machines. This will help promote gender equality, empower women, and encourage more young individuals to take part in the agriculture industry, ensuring its longevity for generations to come.
- **Promotion of public-private partnerships:** By fostering collaborations between government and private entities, mechanization hubs will function as self-sustaining enterprises. This joint effort will encourage funding, enhance financial accessibility, and guarantee the hubs' lasting success.
- **Market access and value addition:** New technology centers will make it easier for farmers to connect with markets by creating central collection points. And with new processing facilities at these centers, farmers can boost the value of their crops, ultimately earning more money and spurring economic development in rural communities.

40.4. Budget

The table below presents a budget breakdown for various priority interventions aimed at enhancing mechanization and agricultural productivity over a five-year period. It outlines costs for constructing mechanization hubs, procuring machinery and equipment such as tractors and harvesters, setting up workshops and maintenance areas, and facilitating access to finance. Additionally, it includes expenses for training, technology transfer, market linkage initiatives, and monitoring and evaluation activities. The total budget for each year and the overall total expenditure are provided, showing allocation across different intervention areas.

Table 107: Investment cost for mechanization programs

| Interventions activities | Unit cost | QTY | 1 Y (USD) | 2 Y (USD) | 3 Y (USD) | 4 Y (USD) | 5 Y (USD) | Total USD |
|--|------------------|------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Infrastructure: mechanization hubs | | | \$435,000 | \$435,000 | \$435,000 | \$435,000 | \$435,000 | \$2,175,000 |
| Building (workshop) | 50,000 | 5 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$1,250,000 |
| Installations of storage facilities | 20,000 | 5 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$500,000 |
| Workshop setup and maintenance area | 17,000 | 5 | \$85,000 | \$85,000 | \$85,000 | \$85,000 | \$85,000 | \$425,000 |
| procurement of machinery and equipment | | | \$950,000 | \$950,000 | \$950,000 | \$950,000 | \$950,000 | \$4,750,000 |
| Tractors | 50,000 | 5 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$1,250,000 |
| Harvesters | 40,000 | 5 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Treshers | 40,000 | 5 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Sorting and grading machines | 30,000 | 5 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |
| Packaging equipment | 30,000 | 5 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | \$750,000 |
| Training and capacity building | | | \$70,000 | \$70,000 | \$70,000 | \$70,000 | \$70,000 | \$350,000 |
| Access to Finance cost | 5,000 | 5 | \$25,000 | \$25,000 | \$25,000 | \$25,000 | \$25,000 | \$125,000 |
| Facilitation of finance options | 5,000 | 5 | \$25,000 | \$25,000 | \$25,000 | \$25,000 | \$25,000 | \$125,000 |
| Administrative costs of finance facilitation | 4,000 | 5 | \$20,000 | \$20,000 | \$20,000 | \$20,000 | \$20,000 | \$100,000 |
| Technology transfer | | | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Partnership with research station institutions and private sectors companies | 100,000 | 2 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Knowledge sharing initiative | 50,000 | 2 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$500,000 |
| Market Linkage | | | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$300,000 | \$1,500,000 |
| Establishment of market aggregation centers: | 40,000 | 5 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Market linkage development | 50,000 | 2 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$500,000 |
| Monitoring and evaluation | | | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$1,250,000 |
| Framework evaluation | 10,000 | 5 | \$50,000 | \$50,000 | \$50,000 | \$50,000 | \$50,000 | \$250,000 |
| Data collection | 100,000 | 2 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Total | | | \$2,305,000 | \$2,305,000 | \$2,305,000 | \$2,305,000 | \$2,305,000 | \$11,525,000 |

XLI. STRENGTHENING RESEARCH AND EXTENSION TO PROMOTE INNOVATIVE TECHNICAL APPROACHES

41.1. Justification

Liberia's agricultural research and extension capacities are not adequately equipped to keep pace with the evolving demands of the agricultural sector. This insufficiency manifests in several ways, including outdated infrastructure, limited human resources, and insufficient funding for research and extension activities. As a result, farmers lack access to cutting-edge agricultural technologies, innovative farming practices, and up-to-date information that could significantly improve their productivity and livelihoods.

The inadequacy of research and extension capacities directly contributes to low agricultural productivity and hampers the widespread adoption of modern farming techniques and technologies. Without access to timely and relevant research findings, farmers continue to rely on traditional farming methods that are often inefficient and yield suboptimal results. Moreover, the lack of extension services means that farmers are unable to access training, technical assistance, and advisory support to help them integrate new technologies and practices into their farming operations effectively.

Liberia's agricultural sector is highly vulnerable to the adverse impacts of climate change, including erratic weather patterns, prolonged droughts, and increased incidence of pests and diseases. The lack of resilience against these climate change impacts exacerbates the challenges faced by farmers and undermines their ability to maintain stable livelihoods. Strengthening research and extension capacities is essential to develop climate-smart agricultural solutions, such as drought-resistant crop varieties, integrated pest management strategies, and soil conservation techniques, which can help farmers adapt to changing climatic conditions and mitigate their negative effects on agricultural production.

Limited access to relevant research findings and inadequate dissemination of information to farmers are major barriers to knowledge transfer in Liberia's agricultural sector. Research outputs often remain confined to academic circles and fail to reach the grassroots level where they are most needed. Additionally, the shortage of skilled personnel, such as agricultural extension agents and technical experts, further impedes the effective delivery of extension services to rural farmers. By strengthening research and extension capacities, Liberia can overcome these barriers and facilitate the seamless flow of knowledge and information from research institutions to farmers' fields, enabling farmers to make informed decisions and adopt sustainable farming practices.

Addressing the challenges facing Liberia's agricultural sector requires a comprehensive approach that encompasses both research and extension components. Strengthening research capacities will enhance the generation of scientific knowledge and innovative solutions tailored to the country's agricultural context, while improving extension capacities will ensure that this knowledge is effectively disseminated and applied by farmers on the ground. By investing in both research and extension, Liberia can build a more resilient and productive agricultural sector that contributes to food security, poverty alleviation, and sustainable development goals.

41.2. MAIN PRIORITY INTERVENTIONS

41.2.1. Assessment of research needs

Conduct a comprehensive assessment of research needs across different agricultural sub-sectors. Identify priority areas for research and extension interventions based on the demands of farmers, market trends, and national development goals. This assessment will guide the allocation of resources and the development of targeted research programs.

41.2.2. Infrastructure development

Enhance the infrastructure for agricultural research and extension by upgrading research facilities, laboratories, and extension offices. Improve access to technology and information through the establishment of digital platforms and communication networks. Strengthening infrastructure will facilitate knowledge sharing and capacity building among stakeholders.

41.2.3. Capacity building and training (extension)

Invest in training programs to build the capacity of agricultural researchers, extension agents, and farmers. Provide training on innovative farming techniques, climate-smart agriculture, and sustainable land management practices. Empower extension agents to effectively communicate research findings and provide tailored advice to farmers. Additionally, promote the involvement of youth and women in agricultural research and extension activities through specialized training programs.

41.2.4. Promotion of public-private partnerships

Foster collaboration between government institutions, research organizations, academia, and the private sector to promote knowledge exchange and technology transfer. Encourage private sector investment in agricultural research and extension activities through incentives and partnerships. Develop joint research projects and extension programs to address common challenges and leverage resources effectively.

41.2.5. Promotion of innovation and technology adoption

Create incentives for the adoption of innovative technologies and practices through research-driven extension services. Facilitate technology transfer and knowledge dissemination through demonstration plots, field days, and farmer field schools. Encourage the development of locally adapted solutions and indigenous knowledge systems to address specific agricultural challenges. Establishment of demonstration farms in promoting technology adoption.

41.2.6. Establishment of a National Fund for Agricultural and Agri-food Research (NAARF)

Purpose: to use the resources made available to it to finance agricultural and agri-food research projects considered to be priorities by the Government, the national agri-food research system, development partners and the users of research results.

Aim: Promoting effective interest on the part of the government, research users and beneficiaries (private sector and producers), decentralized authorities, development partners (bilateral and multilateral) and developing their financial contributions to support agricultural and agri-food

research activities in order to increase agricultural productivity and production and ensure the conservation and processing of agricultural products, while preserving the environment and ensuring sustainable management of natural resources;

- Ensuring a balanced allocation of the NAARF's financial resources between the different zones of the country and the various sub-sectors on the basis of the priorities defined in the strategic plan for agricultural and agri-food research;

- Preparing national institutes and researchers for future competition and sub-regional cooperation in agricultural and agri-food research within ECOWAS and African Union;

- Support the training programmes of the National Agricultural Research System institutions and the upgrading of research results.

A study will be done to define and implement the National Fund for Agricultural and Agri-food Research (NAARF) with informed budget costing.

41.3. EXPECTED RESULTS

- Establishment of specialized sub-research centers and extension offices in key agricultural counties to facilitate research and technology dissemination.
- Increased collaboration between public and private stakeholders in agricultural research and extension activities.
- Development and dissemination of improved crop varieties, pest management strategies, and sustainable farming practices.
- Enhanced capacity of farmers to adopt innovative technologies and practices through tailored extension services.
- Increased productivity, resilience, and sustainability of Liberia's agricultural sector, leading to improved food security and livelihoods.

41.4. 4.0. Budget

The table below outlines a budget plan for various activities over a five-year period. It includes research and development, capacity building for researchers and extension agents, fostering public-private partnership, and promoting innovation and technology adoption. Costs are broken down by activity, unit, quantity, and yearly expenditure. The total budget for each year and the overall total are provided, highlighting allocation across different activities.

Table 108: Cost to strengthen research and extension

| Activities | Unit | QTY | cost | 1 Y | Y2 | Y3 | Y4 | Y5 | Total |
|--|------|---------|------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Infrastructure Development: | | | | \$2,700,000 | \$2,700,000 | \$2,400,000 | \$2,400,000 | \$2,400,000 | \$12,600,000 |
| • upgrading research infrastructures (laboratories) | 3 | 100,000 | | \$300,000 | \$300,000 | | | | |
| • equipment & materials | 3 | 400,000 | | \$1,200,000 | \$1,200,000 | \$1,200,000 | \$1,200,000 | \$1,200,000 | \$6,000,000 |
| • funding for research projects | 5 | 200,000 | | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$5,000,000 |
| • capacity building of researchers | 5 | 40,000 | | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$1,000,000 |
| Capacity building and training (extension) | | | | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$5,000,000 |
| • training workshops and materials | 10 | 50,000 | | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| • travel and accommodation for extension officers | 10 | 50,000 | | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$2,500,000 |
| Promotion of innovation and technology adoption | | | | \$1,950,000 | \$1,875,000 | \$1,875,000 | \$1,875,000 | \$1,875,000 | \$9,450,000 |
| • land lease for demonstration farms | 15 | 5,000 | | \$75,000 | | | | | \$75,000 |
| • infrastructure and equipment for demonstration farms | 15 | 100,000 | | \$1,500,000 | \$1,500,000 | \$1,500,000 | \$1,500,000 | \$1,500,000 | \$7,500,000 |
| • Demonstration | 15 | 25,000 | | \$375,000 | \$375,000 | \$375,000 | \$375,000 | \$375,000 | \$1,875,000 |
| Promotion of public-private partnerships | | | | \$180,000 | \$180,000 | \$180,000 | \$180,000 | \$180,000 | \$915,000 |
| • workshops and conference for collaboration | 12 | 10,000 | | \$120,000 | \$120,000 | \$120,000 | \$120,000 | \$120,000 | \$610,000 |
| • communication and outreach materials | 12 | 5,000 | | \$60,000 | \$60,000 | \$60,000 | \$60,000 | \$60,000 | \$305,000 |
| Total | | | | \$5,455,000 | \$5,455,000 | \$5,455,000 | \$5,455,000 | \$5,455,000 | \$27,965,000 |

XLII. STRENGTHENING THE CAPACITY OF THE MINISTRY OF AGRICULTURE

42.1. JUSTIFICATION

The Ministry of Agriculture in Liberia serves as the cornerstone for ensuring food security, promoting sustainable agricultural practices, and fostering rural development. However, it faces significant challenges hindering its effectiveness in fulfilling these crucial roles. Limited financial resources, inadequate infrastructure, and a scarcity of technical expertise impede the ministry's ability to adequately support farmers and agricultural stakeholders nationwide. Without substantial capacity enhancement, the ministry struggles for ensuring efficient and effective policies and project development, implementation, monitoring and evaluation, as well as resource generation and utilization. and address emerging agricultural issues, thereby compromising Liberia's overall agricultural productivity and resilience.

To address these challenges and fortify the Ministry of Agriculture's capacity, concerted efforts are necessary to invest in human resources, infrastructure, and training. This entails recruiting and training skilled personnel, upgrading MoA facilities and equipment, and implementing digital solutions to streamline data collection and dissemination. Additionally, fostering partnerships with international organizations, research institutions, and private sector entities can facilitate knowledge exchange, resource mobilization, and technology transfer, further augmenting the ministry's capabilities. By prioritizing capacity strengthening initiatives, the Ministry of Agriculture can better fulfill its mandate, empower farmers, and contribute to Liberia's sustainable agricultural development and food security objectives.

42.2. Priority areas for intervention

42.2.1. Human resource development

Enhance employees' skills and knowledge in agricultural policy development and the Ministry's regulatory and oversight functions through comprehensive training and capacity building programs at all levels. This will enable them to provide more effective assistance to farmers and industry stakeholders and play their role of control and regulation the agricultural sector

42.2.2. Infrastructure development

Upgrade the ministry's physical infrastructure, including offices, laboratories, and storage facilities, to improve operational effectiveness and service delivery. Procurement of tools and technologies will further augment the ministry's operational capabilities.

42.2.3. Strengthening of Policies and Institutions

Establish robust institutional frameworks and policies to promote sustainable agriculture and rural development. Enhancing the ministry's capacity in monitoring and evaluation by strengthening Management of MOA Project Management Unit is essential for improved coordination and oversight of agricultural initiatives nationwide.

42.2.4. Stakeholder Engagement

Foster strong alliances with farmers, civil society organizations, and other stakeholders in the agriculture sector to ensure successful program implementation. Enhancing the ministry's ability to engage with stakeholders will ensure their needs and objectives are effectively addressed.

42.3. Budget

This detailed budget plan allocates resources across various priority areas over a span of five years, totaling \$14,800,000. Each priority area is broken down into specific activities, units, unit costs, and yearly allocations, providing a comprehensive overview of the Ministry of Agriculture's capacity strengthening efforts.

Table 109: Cost to strengthen the MOA

| Priority of strengthening capacities | Unit | Unit cost | Y1 (USD) | Y2 (USD) | Y3 (USD) | Y4 (USD) | Y5 (USD) | Total (USD) |
|--|-------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Human resource development | | | \$800,000 | \$800,000 | \$600,000 | \$400,000 | \$300,000 | \$2,900,000 |
| Training and capacity building for staff | staff | 25,000 | \$700,000 | \$700,000 | \$500,000 | \$300,000 | \$200,000 | \$2,400,000 |
| workshops & seminar | workshop | 10,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$500,000 |
| Infrastructure development | | | \$975,000 | \$975,000 | \$975,000 | \$825,000 | \$725,000 | \$4,475,000 |
| Renovation and improvement of office facilities | office | 30,000 | \$450,000 | \$450,000 | \$450,000 | \$300,000 | \$200,000 | \$1,850,000 |
| Procurement of equipment and technology | equipment | 35,000 | \$525,000 | \$525,000 | \$525,000 | \$525,000 | \$525,000 | \$2,625,000 |
| Policy and institutional strengthening | | | \$240,000 | \$240,000 | \$240,000 | \$240,000 | \$90,000 | \$1,050,000 |
| Development of new policy and Ministry' framework | framework | 15,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$450,000 |
| Capacity building for policy implementation (M&E section) | staff | 25,000 | \$150,000 | \$150,000 | \$150,000 | \$150,000 | | \$600,000 |
| Stakeholder engagement | | | \$90,000 | \$90,000 | \$90,000 | \$90,000 | | \$360,000 |
| Consultation meeting with farmers & civil society organization | meeting | 20,000 | \$50,000 | \$50,000 | \$50,000 | \$50,000 | | \$200,000 |
| Collaboration with stakeholders on program implementation | meeting | 10,000 | \$40,000 | \$40,000 | \$40,000 | \$40,000 | | \$160,000 |
| Grand Total | | | \$2,105,000 | \$2,105,000 | \$1,905,000 | \$1,555,000 | \$1,115,000 | \$8,785,000 |

XLIII. DEVELOPING INCLUSIVE AGRIBUSINESS MODELS FOR THE INTEGRATION OF SMALLHOLDERS INTO AGRIFOOD VALUE CHAINS

43.1. CONTEXT AND JUSTIFICATION

Experience has shown that the emergence and development of high-performance rural micro-businesses helps meet agricultural needs for basic farm equipment, small tools, various inputs and local services at competitive prices. Such enterprises also enable agro-silvopastoral production to be processed and marketed, create income and give young entrepreneurs (men and women) greater dignity in social dialogue and decision-making in their own lives.

Inclusive business models promote the integration of smallholders into markets, with the underlying principle that there are mutual benefits for poor farmers and the business community. An inclusive business model approach reinforces the value chain by focusing exclusively on strengthening business models that link small farmers to value chains. Smallholder business models include traders, farmer organizations, agrifood processors and large buyers. The range of business models that make up an agricultural value chain includes farm enterprises, traders, agro-processors, wholesalers, transporters, warehouses and retailers, among others.

The Government will support inclusive agribusiness models so that developments in agriculture help to address the needs of vulnerable groups and contribute to poverty reduction and food security. Reasons for applying an inclusive business model include raising smallholders' incomes, mainstreaming modern business and market-oriented production skills, involving the private sector in national development goals, and improving food security through the commercialization of food and cash crops.

43.2. Expected outputs

The Government will promote agribusiness models that:

- Provide a living wage to vulnerable groups, such as small farmers, women and young people working for an enterprise or supplying a buyer, while also enabling the buyer to remain competitive;
- Promotes agricultural entrepreneurship and enterprise development in the targeted agrifood value chain
- Uses flexible trading arrangements that make it easier for small farmers or enterprises to supply a buyer,
- Supports farmers and small enterprises in establishing a stronger negotiation position, through skills development, collective bargaining and access to market information and financial services;
- Builds on the skills and expertise of existing market players, including traders and processors, and promotes collaboration, transparent pricing mechanisms and risk sharing;
- Allows diverse business models, to enable the rest of the sector to benefit from upgraded skills and technologies and to avoid overdependence on single buyers.
- Support 2,000 young people and women in 200 microenterprises involved in the manufacture of organic fertilizers and bio-pesticides
- Support establishment of integrated market-gardening/fruit-growing perimeters by supplying farming equipment (tractors, storage warehouses, air dryers, inputs). The

program will support the creation of 950 microenterprises covering 9,500 young people and women.

- Support setting up youth microenterprises to process and distribute cereal and vegetable products through: development of local packaging and processing capacity to extend storage life and manage seasonal oversupply. The program will support the establishment of 50 local packing houses and 50 processing units within the framework of a collective financing and management mechanism.
- Promotion of improved sheepfolds for youth and women: 15,000 improved sheepfolds will be set up to meet technical standards. These sheepfolds will have a capacity of 30 head and will include different compartments to provide areas for breeding, kidding and finishing.
- Support setting up of improved collective and family poultry production units.: 10,000 young people and women will be supported in setting up improved collective and family poultry production units.: 300 associate professionals will be trained in poultry farm management
- Improve women's and young people's employability in the conservation, processing and marketing of fishery and aquaculture products:
- Small pilot units to add value to fish products, will be set up to help women diversify their products
- Construction and equipping of modern artisanal processing units will be supported as planned and budgeted in fisheries value chain

43.3. Key strategic interventions

43.3.1. Combine investments in smallholder agriculture with policies on the role of cooperatives in value chains

The main challenges facing small farmers and enterprises are well known and documented. They include low and fragmented production, lack of access to extension services and finance, and weak marketing capacity. In response to these challenges, the MOA will: (i) target the intensification of production combined with the reorientation of farmers from subsistence farming to market-oriented “farming as a business”. (ii) support farmer organizations and improve the provision of market-oriented services for their members.

The overarching objectives of these “on- and close-to-farm” interventions remain critical for addressing local market constraints and scaling up inclusive business models. This type of targeted support is more likely to be scalable if policies supporting agricultural cooperatives are clearly formulated and broadly disseminated among major stakeholders.

Rwanda is an example of a country where clear policies strengthen the role of cooperatives and are widely understood. The National Policy on the Promotion of Cooperatives, the Rwanda Cooperative Agency and a growing cooperative movement have contributed to the successful implementation of land consolidation and crop intensification programs. This success has resulted in the tripling of production between 2008 and 2012 for crops such as maize and beans.

43.3.2. Promote agricultural entrepreneurship and enterprise development in the targeted agrifood value chains

Promoting inclusive agribusiness development in the country will require a broad value chain development including several strategic interventions that provide the necessary ecosystem for agribusinesses to thrive, be profitable, provide employment, and contribute to food and nutrition security. The model should foster investment in agricultural entrepreneurship (agripreneurship) and enterprise development for smallholders (notably SMEs) along the value chain, based on market demand and viable business plans promoted by organizations and/or individuals. It should help smallholders to shift from a subsistence to a market-oriented, nature-conservative, nutrition-sensitive and resilient agriculture in the context of climate change. This can be achieved through the following actions:

- Strengthen the organization of smallholders in a way that they form an entity for improved value chain coordination and bargaining power
- Reduce the cost and risk of doing business with smallholders, building on proven best practices
- Support access, to affordable and smallholders' friendly financial services for agripreneurship
- Promote agribusiness incubation in the country through the development of enterprises support organizations (ESOs), namely agribusiness incubators and accelerators⁵³; to support smallholders-led business development in priority value chains, as organizations or individual entrepreneurs.
- Support the creation/strengthening of enterprises (SMEs) along the value chain, at production, processing, storage, and marketing)
- Identify and support market opportunities for healthy and nutritious food at national and sub-regional level, particularly for SMEs,
- Promoting connections with identified markets at national, sub-regional and international level, by establishing direct links with buyers
- Foster market access to smallholders' businesses by promoting home grown school feeding business through PPP
- Support capacity building for government institutions, service providers and smallholders (individuals, organizations and SMEs) to strengthen enterprises development in the targeted value chains including: Training on sustainable food value chain approach and tools through rapid and appropriate value chain analysis and business modeling (EX-ACT Value Chains, Rural Invest); Training and technical assistance on strategic planning tools, economic and financial analysis, sustainability, innovative financing, and digital Agriculture tools for increased accessibility to business and financial services and risk management tools for value chain actors; Technical training on technologies and good production, manufacturing and hygiene practices; Entrepreneurial training, management, marketing and integration into the business world; Training on export market standards and requirements; Training in contract management and logistics; Training and coaching on

⁵³ See definitions and concepts in FAO. 2023. *Agribusiness incubation and acceleration landscape in Africa – Role of agribusiness incubation in promoting agricultural entrepreneurship and enterprise development*. Rome. <https://doi.org/10.4060/cc5763en>

marketing and brand image; Formalization, quality, certification and access to services and funding, incubation management, coaching; Drawing up and implementing a support plan for women/young agripreneurs benefiting from training/incubation in self-employment or entrepreneurship in the targeted value chains

43.3.3. Strengthen the capacities of buyers, to improve the reliability of demand for smallholders' produce

To ensure the development of coordinated and efficient smallholder business models, it is also important to strengthen the reliability of demand from buyers. Small traders and artisanal processors are often the only market outlets for smallholders, particularly in the value chains for staple foods such as cassava, rice. These buyers are typically small and fragmented, with weak business skills and limited access to finance and inputs for their enterprises. These characteristics have negative impacts on the reliability of market access for smallholders.

In addition to providing support to farmer organizations, demand can also be strengthened by building the institutional capacity of traders and artisanal food processors' associations.

The demand side of the chain can also be strengthened by engaging existing buyers in the delivery of projects and programmes for smallholder value chains. For example, under its Crop Intensification Programme, Rwanda's Ministry of Agriculture contracts large traders and agrodealers to distribute fertilizer and train farmers on its application. This approach has contributed to the transfer of knowledge among value chain actors, better coordination in supply and demand, and a private sector-led approach to the development of smallholder value chains.

43.3.4. Ensure all value chain actors are fairly represented in public-private partnerships and on commodity associations or value chain committees

Public-private partnerships (PPPs) are potential mechanisms for developing inclusive business models in agricultural value chains. PPPs can be used to link large numbers of smallholders to the industrial sector. The goal of PPPs is to achieve the objectives of both the public and the private sectors. To justify public-sector investment, clear benefits for the general public are needed, such as poverty reduction, food security and overall agro-industrial growth.

Intermediaries can screen PPP proposals, monitor and evaluate their implementation, and engage in dispute resolution and reporting. Example of PPP that promote inclusive business models are the Agri-business Innovation Fund run by the Agricultural Sector Coordination Unit in Kenya. Value chain round tables and commodity associations are also useful vehicles for bringing together the public and private sectors to discuss concerns. They can address areas such as arbitration and regulation, advising on technical norms such as grades and food safety standards, research priorities and attracting investment.

To ensure the inclusiveness and sustainability of these initiatives, all groups need to be fairly represented in discussions including associations representing small farmers, traders and processors.

43.3.5. Adapt lessons and tools from the development of high-value crop chains and apply them to staple crop chains

Public and private-sector support to smallholders' integration into value chains has traditionally prioritized cash crops and high-value crops. This priority has changed since the food crisis of 2008 and there is now more strategic emphasis on the commercialization of staple food crops such as rice, maize, cassava. This approach has been validated by the growing demand for locally produced, fresh and processed food for domestic urban markets, driven by rapid urbanization and population growth in developing countries. Many lessons and tools used to support cash and high-value crops can be adapted to staple crop value chains. However, approaches need to be tailored to the different commodity structures.

43.3.6. The Government may also consider the following longer-term policy implications.

The role of inter-ministerial strategic planning and implementation: Different aspects of the strategic interventions fall under the mandates of different ministries. Productivity falls under the mandate of the ministry of agriculture, while laws governing cooperatives, traders and processors fall under the ministry of trade. A separate ministry will deal with food security and nutrition, while the ministry of finance will deal with investment in agriculture. Initiatives promoting inclusive business models, therefore, relate to lines of responsibility in several ministries.

The need for balanced engagement by the public and private sectors: Inclusive business models require the balanced engagement of the public and private sectors to ensure that growth in the agriculture sector leads to poverty alleviation. Models driven by either the public or the private sector can result in poorly coordinated markets or further market exclusion for vulnerable groups. Promoting value chain platforms and PPPs, provide useful mechanisms for incorporating the interests of both the private and the public sectors into inclusive business model initiatives.

43.3.7. The importance of a modern agricultural education system for the sector's rejuvenation:

There is an urgent need to rejuvenate the agriculture sector so that young people can participate in the development of inclusive business models. National education systems are instrumental, but agricultural courses need to be modernized to make them more attractive to young people and relevant to the needs of agribusinesses. This requires strategic inter-ministerial planning involving the ministries of agriculture, education and trade along with representatives of tertiary and secondary institutes, farmer organizations and agro-industry.

43.3.8. The MoA will design typical farm models

According to types of speculation and ecological zone, to guide investors in the sector, special incentives will be made available to all those wishing to invest in this form of agribusiness. The MoA will ensure quality control of these farms.

43.3.9. The MoA will implement the following initiatives to support youth and women in agrobusiness:

- An assessment of the range of agricultural production training and services on offer, and the capitalization of best practices.
- an assessment of financing offers for youth entrepreneurship
- an assessment of the profiles of youth and women and young agrobusiness beneficiaries
- Technical capacity building to improve employability and sustainable entrepreneurship for women and young entrepreneurs in agriculture and fisheries value chains:
- Developing the entrepreneurial skills of young people and women
- Improving access to financial and non-financial services to support the sustainability of agrobusinesses and jobs created by young people and women (land, inputs, productive water, energy, equipment, etc.), financing and market.
- Dissemination of digital solutions to support the development of young people's and women's activities in value chains (e-consulting, e-commercialization, digital innovation, etc.) and the promotion of young people's access to digital finance.

43.3.10. Capacity building to enhance the employability and sustainable entrepreneurship of young agripreneurs in agricultural and fisheries value chains:

- ***Setting up/strengthening small businesses to produce goods and services***

Microenterprises producing organic fertilizers: The program will support 2,000 young people and women in 200 microenterprises involved in the manufacture of organic fertilizers and bio-pesticides.

Capacity-building will be carried out and new organic fertilizer techniques based on locally available products will be developed. The young people and women trained will receive material and equipment support as well as a grant for the acquisition of primary inputs.

Creation/promotion of micro-businesses manufacturing and repairing agricultural materials and equipment. This activity will be carried out by 2,000 young people trained at technical training centers who have been awarded certified qualifications.

- ***Setting up youth microenterprises to produce fruit seeds and seedlings.***

The aim of this activity is to set up a modern, competitive and sustainable seed industry, backed by research institutions and agricultural skills for the production of quality seeds and seedlings. These micro-businesses will be located in intensive fruit production zones

- ***Support for the creation of youth microenterprises in vegetable production through the establishment of modern orchards***

Particular support will be given to local authorities to define a local strategy for access to land for young people and women.

- ***Supporting establishment of integrated market-gardening/fruit-growing perimeters by supplying farming equipment (storage warehouses, air dryers, inputs).***

The program will support the creation of 950 microenterprises covering 9,500 young people and women.

- ***Support setting up youth microenterprises to process and distribute cereal and vegetable products through***

Development of local packaging and processing capacity to extend storage life and manage seasonal oversupply. The program will support the establishment of 50 local packing houses and 50 processing units within the framework of a collective financing and management mechanism.

- ***Promotion of improved sheepfolds for youth and women***

15,000 improved sheepfolds will be set up to meet technical standards. These sheepfolds will have a capacity of 30 head and will include different compartments to provide areas for breeding, kidding and finishing.

- ***Support setting up of improved collective and family poultry production units.***

10,000 young people and women will be supported in setting up improved collective and family poultry production units.

300 associate professionals will be trained in poultry farm management

- ***Improve women's and young people's employability in the conservation, processing and marketing of fishery and aquaculture products:***

Small pilot units to add value to fish products, will be set up to help women diversify their products

Construction and equipping of modern artisanal processing units will be supported as planned and budgeted in fisheries value chain

Storage and conservation conditions for fishery and aquaculture products through the cold chain as planned and budgeted in fisheries value chain

The MoA will support young people and women to have easy access to the financial resources needed to set up their agribusiness through the AEDB planned to be set up under NADP

Table 110: Estimated Cost to developing inclusive agribusiness models for the integration of smallholders into agrifood value chains

| Priority | Total (USD) |
|--|--------------------|
| Support farmer organizations to improve the provision of market-oriented services for their members. | \$500 000 |
| Improve and broadly disseminate policies supporting agricultural cooperatives | \$ 500 000 |
| building the institutional capacity of traders and artisanal food processors' associations | \$ 800 000 |
| Support inter-ministerial strategic planning and implementation | \$200 000 |

| | |
|---|------------------------------|
| Capacity building to enhance the employability and sustainable entrepreneurship of young and women in agribusiness | \$2 000 000 |
| Rejuvenate the agriculture sector so that young people can participate in the development of inclusive business models | \$500 000 |
| TOTAL | \$4 500 000 |
| Access to finance to set up youth and women agrobusiness will be done through the AEDB that is already budgeted in the NADP | For the record 12 000 000 |

XLIV. ACCESS TO FINANCE THROUGH THE ESTABLISHMENT OF THE AGRICULTURE ENTERPRISE DEVELOPMENT BANK

44.1. JUSTIFICATION

Access to finance through establishment of the Agriculture Enterprise Development Bank is an important dimension of Liberia's agricultural economy for a number of reasons, including:

- Access to finance: Farmers, particularly smallholders, often find it difficult to access traditional financial services due to their unstable income, the seasonal nature of their business and the lack of sufficient collateral. A national agricultural bank can provide financial services tailored to the specific needs of the agricultural sector, such as agricultural loans at affordable interest rates, adapted savings products and agricultural insurance.
- Promotion of agricultural investment: an Agriculture Enterprise Development Bank (AEDB) will play a key role in promoting investment in the agricultural sector by offering attractive financial products to farmers and agricultural enterprises. This can help boost agricultural productivity, modernise farms and increase farmers' incomes.
- Rural poverty reduction: By providing easier access to financial services, a AEDB will help reduce rural poverty by enabling farmers to invest in their businesses, their production methods and increase their incomes. This will help boost food security and stimulate economic development in rural areas.
- Agricultural risk management: Farmers are exposed to a variety of risks, such as weather hazards, crop disease and fluctuating commodity prices. Agriculture Enterprise Development Bank (AEDB) will offer tailored agricultural insurance products to help farmers manage these risks and protect their livelihoods.
- Sustainable development: By supporting sustainable agricultural development, AEDB will encourage the adoption of environmentally friendly farming practices, the promotion of organic farming and the conservation of natural resources.

44.2. MAIN PRIORITY INTERVENTION

44.2.1. Conduct Feasibility Study

Before setting up the Agriculture Enterprise Development Bank (AEDB), it is essential to the Government to carry out a thorough feasibility study to assess the viability of the project. This study should analyse the demand for agricultural financial services, identify farmers' needs, assess the existing financial market and determine the resources required.

Legal and regulatory framework: The Minister in charge of Finance will establish a sound legal and regulatory framework for the creation and operation of the AEDB. This includes defining the organizational structure, objectives, policies and procedures, as well as compliance with applicable banking laws and financial regulations.

Capitalization: Setting up a n AEDB requires adequate start-up capital to guarantee its solvency and its ability to meet farmers' financing needs. This may involve mobilising public funds, public-private partnerships or foreign investment.

Staff recruitment and training: It is essential to recruit and train highly qualified staff specialized in banking and agriculture to ensure the smooth operation of the national agricultural bank. Staff should have a good knowledge of agricultural practices, financial management and banking services.

Development of adapted financial products: The AEDB should develop financial products adapted to the specific needs of farmers, such as agricultural loans at affordable interest rates, savings and credit services, agricultural insurance, etc.

Partnerships and networking: It is important to establish strategic partnerships with other players in the agricultural sector, such as agricultural cooperatives, farmers' organizations, development agencies, research institutions, etc. These partnerships can strengthen the capacity of the national agricultural bank and broaden its impact.

44.3. EXPECTED RESULTS

A feasibility study has been carried out to enable the Government to take the necessary decisions for the implementation of an AEDB

44.4. BUDGET

Table 111: Investment cost for the NADP communication strategy

| Interventions | Estimate Cost USD |
|----------------------------------|--------------------------|
| Carry out a feasibility study | 300,000 |
| Raising investment amount needed | 40 ,000, 0000 |
| GRAND TOTAL | 40, 300,000 |

CHAPTER SEVEN: COMMUNICATION STRATEGY

XLV. COMMUNICATION STRATEGY OF THE NADP

45.1. INTRODUCTION

Communication like any sector or profession, is vital for enhancing the productivity and sustainability of the agriculture sector. Part of the many challenges besetting agriculture in Liberia include communication, especially as communication nowadays transcends beyond traditional media (radio, newspaper and television). However, effective communication in agriculture is crucial for improving agricultural practices, increasing productivity, and ensuring food security. Overall, it is crucial for luring investment through the private sector, marketing produce and products and attracting youth and vulnerable people involvement. Here are key aspects of agriculture communication in Liberia. Therefore, by leveraging various communication channels and addressing existing challenges, Liberia can make significant strides in agricultural development, selling the National Agriculture Development Plan (NADP) 2024-2030.

The NADP aims to harness Liberia's agricultural potential, promote productivity growth, processing, and market access, and support food self-sufficiency and economic development through a value-chain approach. This communication strategy is designed to effectively guide all activities related to internal and external communications for the NADP and support the implementation of the agriculture interventions, thereby achieving the results sought by the NADP. It is expected to contribute to the development of high-quality communications materials and investment in agriculture. It will enhance the marketing of Liberia's agriculture potential and create visibility, showcase the sector governance and active coordination among stakeholders/partners and the private sector.

Besides, it will lead the efforts of promoting agriculture excellence capable of consistently showcasing the national agriculture and food service potential, including soil fertility, climate suitability, national organic footprint, farming practices, commodity or crops nutritional content and facilitate competitive and professional highlights of regional, county, district, farmer and cooperative production achievement. It will develop programs to promote local development in agriculture sciences, technologies and innovations. It will use diverse media platforms available (traditional and modern) and other means to enhance and consolidate promote agriculture.

45.2. OBJECTIVE OF COMMUNICATION STRATEGY

- Provide and lead meaningful guidance on how the communication and knowledge products for the NADP and agriculture sector are generated, managed and disseminated
- Enable the development of impactful communication materials, ensure advocacy and messaging reach relevant audiences, and at the same time ensure transparency on the agriculture sector's coordination, governance, processes and implementation
- Raise awareness and appreciation of remarkable investments, interventions and achievements in the agriculture sector and commodities subsectors
- Provide visibility for donors financing FAO projects
- Advocate for greater investment by the government in rural livelihoods and food security
- Promote High Conservation Values and Organic profile as a tool for identifying, managing and monitoring critical values in the natural and production landscape

- Enable replicating and upscaling of the good practices through effective knowledge management and key lessons learned

45.3. SUMMARY OF THE NADP

The National Agricultural Development Plan (NADP), which runs from 2024-2030 covers the agricultural and rural sectors in Liberia. It was developed by the Ministry of Agriculture in collaboration with stakeholders and development partners to enable Liberia to fully utilize its agricultural development potential. It is in back in conformation with Liberia's policies and strategies, including the Liberia Rising Vision 2030, the Agricultural Sector Vision (2017-2025), the National Agriculture Development Agenda 2024-2029, Liberia National Rice Development Strategy II, 2018-2030 and Liberia National Climate Adaptation Plan 2020-2030.

It proposes specific strategies to promote productivity growth in the agriculture sector through a value-chain approach to agriculture development and takes specific actions to develop the value chains of targeted agricultural commodities that support national food self-sufficiency and economic development. The development objective of the NADP is to enable Liberia to fully exploit its agricultural potential, by promoting productivity growth in the agricultural sector through specific actions aimed at developing value chains of targeted agricultural products that support national food self-sufficiency and the development of the national economy.

The NADP is prioritizing five key value chains with specific commodities, which include:

- Food Crops Value-chain (rice, cassava, maize, vegetables)
- Cash Crop Value Chain (rubber, cocoa, coffee, cashew and coconuts)
- Fruit crop Value Chain (avocado, citrus, mango, banana and papaya)
- Livestock value chain (Poultry, cattle, goat, sheep, piggery)
- Fisheries and aquaculture value chain (inland fisheries)

The development of these value chains and different commodities will be supported by cross-cutting investments which address common issues such as:

- Mechanization with a focus on the creation of mechanization hubs in production clusters for both production and postharvest handling
- Strengthening agricultural research and extension capacities to promote innovative technical approaches
- Access to finance through the establishment of the agriculture enterprise development bank
- Strengthening the capacity of the Ministry of Agriculture

45.4. FRAMEWORK OF COMMUNICATION STRATEGY

Under this, the framework highlights the goal, vision, mission, outcome and key strategic interventions of the identified to enable innovative and effective communication, ensure visibility, and secure strategic partnerships for the NADP, the Liberian agriculture sector and its commodity subsectors. It aims to ensure visibility and impactful communication for the successful implementation of the NADP 2024-2030, investment in the Liberian agriculture sector and its commodity subsectors.

However, the full realization of NADP and the Liberian agriculture sector's potential will lead the production of cutting-edge, innovative, rigorous and accessible evidence through communication for private sector investment, impacting policy formulation, implementation and up-scaling for the full realization of agriculture.

45.5. EXPECTED OUTPUTS

- Strategic partnerships and effective communication of Liberian agriculture potential enhanced

45.6. STRATEGIC INTERVENTIONS

To ensure the achievement of the goal and the outcome of this CS, the following broad strategic interventions will be pursued.

45.6.1. Increase Media Engagement

- Foster, manage and sustain partnerships with the local media channels (print, broadcast, television and social media) through relevant programs (workshops and meetings) and news stories to ensure wider reach of the NADP, Liberian agriculture progress and impact
- Media trips and visits to major agriculture production sites, and interactions with the local communities, farmers, producers and agribusinesses will also be organized.
- The MOA will also make use of its social media channels and expand to other popular social media
- to upload appropriate content for raising awareness and garnering support from various stakeholders and partners.

45.6.2. Improve Private Sector Ownership

- The MOA will adopt effective and appropriate communications systems and processes such as coordination meetings, workshops and training to enable an increased understanding of the Liberian agriculture sector deliverables and requirements. Such enhanced understanding will strengthen strategic partnerships and improve private sector ownership of agriculture investment.
- Enhance MOA Institutional Capacity in Communication
- Digital transformation is a reality and the need of the hour, especially in the field of marketing and communications. Also, other skills such as report writing, storytelling etc. are essential tools for the communications team for effective and efficient storytelling and messaging.
- MOA as the lead in the agriculture sector, MOA and its sister agencies are endowed with a rich pool of experts in diverse fields and experience in community mobilization at a grassroots level. The MOA will capitalize on these assets.
- Therefore, MOA will facilitate along with implementing partners and other development partners to build the capacity of the MOA, CARI, CDA, NAFAA and LACRA communications team in the field of media engagement, storytelling, digital analysis, crisis communication, audio visuals, graphics, project communications and branding.

45.6.3. Develop and Promote Appropriate and Effective Communication Products, Systems and Processes

MOA will rebrand and facilitate all of its parastatals to rebrand their webpage dedicated to promoting the NADP and the Liberia agriculture potential on their website. MOA will also facilitate and encourage the National Investment Commission, the Ministry of Foreign Affairs and different Liberian embassies, and the Ministry of Information, Culture Affairs and Tourism to promote the Liberian agriculture potential. All basic agriculture potential and investment information including data and lessons learned will also be shared through these different websites.

Impactful communication materials and agriculture investment products will be developed to reach audiences at all levels. A quarterly newsletter on sector highlights will be shared through websites, print media publications, social media and press conferences. These initiatives will help MOA to effectively communicate and garner stakeholder and community support for policy advocacy, political will and commitment.

MOA will advocate for every Thursday of each week declaration by the president as the day to wear and promote agriculture investment in Liberia paraphernalia. Also, MOA along with its parastatals will facilitate and mandate its staff to always wear promotional paraphernalia at all events at home and abroad.

A crisis communications plan will be developed to provide guidance and to ensure that proper mechanisms are put in place to respond and communicate during man-made or natural crises capable of affecting the agriculture sector and investment. Also, regular feedback will be solicited through surveys, feedback forms, hotlines, help desks, online forums, and discussion groups

45.7. TARGET AUDIENCES

Target audiences will vary based on value chain and commodities-specific programs, but the private sector, including smallholder farmers, large companies, agribusinesses, processors, investors, etc. will be a key audience and relevant to the overall communication strategy. A contact directory will be developed and updated regularly as a means to share important materials with stakeholders directly via email.

Development partners and key partners in the areas of agriculture, livestock and fisheries need to be fully aware of Liberia's capabilities and areas of comparative advantage. Decision-makers across government, particularly the National Agriculture Steering Committee (NASC), which is headed by H/E, the President of the Republic of Liberia, and includes Heads of Line Ministries, Agencies, and Commissions (MACs). It is the highest decision-making body for the NADP. Other important audiences, including the donor community, UN agencies and programs, that influence funding decisions, local and international NGOs, financial institutions, investors and civil society organizations, who can be partners both in program implementation and in advocacy, the Libera Chambers of Commerce, business associations, agriculture professionals, beneficiaries, and the general public.

45.8. COMMUNICATION CHANNELS AND TOOLS

The MOA and its parastatals communications team can use communication tools and channels suited to the different key audiences and best suited to articulate the given messages or communication focus areas. Communication tools and channels will range from outreach opportunities, advocacy campaigns, field visits, use of digital platforms and social media, use of promotional materials and media relations, including but not limited to the following:

- Facebook and Thread
- YouTube channel, X (formerly Twitter) and TikTok
- Website
- WhatsApp groups (join or create)
- Internal and External Newsletters
- Local, National and International Radio
- Newspapers (local and international)
- Events (Meetings, Conferences, Seminar, Symposium, Town Halls, Focus Groups, Roundtables, Workshops, Trainings etc.)
- Print (Posters, Banners, Hand band, stickers, Brochures, Fact Sheets, etc.)
- Videos and pictures
- Success Stories, Case Studies etc.

45.9. KEY MESSAGES

To avoid disseminating conflicting messages, the key messages will be drafted annually to guide the MOA and its parastatals, MACs, partners, etc when communicating publicly. Messages will be allowed repeated use in all communications tools, and to all stakeholders, including social media, talking points, brochures etc. Each value chain or commodity communication will develop specific key messages, however, the below will be incorporated or guide all communication materials to ensure that NADP's overall objectives are emphasized.

- NADP's strategic approach focuses on economic growth, food security, employment, rural stability and a sustainable environment. NADP conforms to Liberia's achieving the UN Sustainable Development Goals, AU and ECOWAS regulations.
- The NADP's objective is to enable Liberia to fully exploit its agricultural potential, by promoting productivity growth in the agricultural sector that will enable Liberia to be a middle-income and food-secure country, free of hunger and malnutrition.
- The NADP focus on five crop value chains.

45.10. PLANNING AND STRATEGY

This communication strategy encompasses the entire NADP implementation and serves as a general guide for increasing visibility in the agriculture sector of Liberia. It will be very effective for programs and the agriculture institution-specific plans to also be drafted to focus on areas that need added awareness. To streamline communication activities, the followings key for consideration.

MOA and its parastatals hold weekly individual communication teams and a joint quarterly jointly – use these to discuss ideas, plan, and implementation of the NADP.

Hold biannually between and Communication Team Meetings – this is an opportunity for the project teams to highlight important milestones and achievements that need visibility.

To facilitate the development of communication materials, a tracking document of milestones should be shared between the communication team and the MOA.

The communications focal persons of each MACs and MOA parastatals should use the below plan to maintain consistent engagement with the target audience. Exceptions are inevitable - newsworthy activities may happen outside of this schedule; materials and communications channels can be used in real-time or as needed.

45.10.1. Communication Strategy Work Plan for NADP Implementation (2024-2030)

| Phase | Activity | Description | Target Audience | Timeline | Responsible Party |
|---|--------------------------------------|---|--|------------|-------------------------------|
| Phase 1: Initial Launch (Months 1-3) | Announcement Campaign | Launch NADP with a high-profile event featuring the President and key stakeholders. | All stakeholders | Month 1 | Ministry of Agriculture, NASC |
| | Press releases and press conferences | Distribute press releases and conduct press conferences to announce NADP. | Media, General Public | Month 1 | Ministry of Agriculture |
| | Website and social media launch | Launch official NADP website and social media pages. | All stakeholders | Month 1 | Ministry of Agriculture |
| | Stakeholder briefings | Conduct briefings with government officials, policy makers, and financial institutions. | Government Officials, Financial Institutions | Months 2-3 | Ministry of Agriculture |
| | Community forums | Hold forums to introduce NADP to farmers and local communities. | Farmers, Local Communities | Months 2-3 | Ministry of Agriculture, NICC |
| | | | | | |

| Phase | Activity | Description | Target Audience | Timeline | Responsible Party |
|--|---------------------------------|---|--|----------------------|----------------------------------|
| Phase 2: Engagement and Participation (Months 4-12) | Educational Campaign | Develop and distribute educational materials explaining NADP's components and benefits. | Farmers, Agribusinesses, Extension Workers | Months 4-6 | Ministry of Agriculture |
| | Training sessions and workshops | Conduct training sessions and workshops for farmers, agribusinesses, and extension workers. | Farmers, Agribusinesses, Extension Workers | Months 4-12 | Ministry of Agriculture |
| | Media outreach | Feature success stories and case studies in local media. | General Public, Media | Months 4-12 | Ministry of Agriculture |
| | Radio programs | Use radio programs to reach rural areas. | Rural Communities | Months 4-12 | Ministry of Agriculture |
| Phase 3: Sustained Communication (Year 2-6) | Regular Updates | Provide quarterly updates through newsletters, social media, and community meetings. | All stakeholders | Ongoing Quarterly | Ministry of Agriculture |
| | Annual progress reports | Publish annual reports highlighting progress and milestones. | All stakeholders | Annually | Ministry of Agriculture |
| | Coordination meetings | Maintain regular coordination meetings with NASC and NICC. | Government Officials, Policy Makers | Bi-monthly | Ministry of Agriculture, NASC |

| Phase | Activity | Description | Target Audience | Timeline | Responsible Party |
|--|----------------------|--|-------------------------------------|-------------------|-------------------------------|
| | Continuous feedback | Facilitate continuous feedback through surveys and forums. | All stakeholders | Ongoing | Ministry of Agriculture |
| Monitoring and Evaluation (Ongoing) | KPIs and Metrics | Measure media coverage, stakeholder engagement, and feedback from surveys. | Ministry of Agriculture, NICC | Bi-annual Reviews | Ministry of Agriculture, NICC |
| | Regular reviews | Conduct bi-annual reviews of the communication strategy's effectiveness. | Ministry of Agriculture, NASC | Bi-annual | Ministry of Agriculture, NASC |
| | Strategy adjustments | Adjust strategies based on feedback and changing circumstances. | Ministry of Agriculture, NASC, NICC | Ongoing | Ministry of Agriculture, NASC |

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TECHNOLOGY IN AGRICULTURE

RICE VALUE CHAIN



SUPPORT FOR INTEGRATED MARKET GARDENING



FISH VALUE CHAIN



Ministry of Agriculture
Ministerial Complex Building
Monrovia, Liberia
Email: info@moa.gov.lr
Web: www.moa.gov.lr