Republic of Liberia

Technology Action Plan
For the Adoption and Diffusion of Climate Change Agriculture Adaptation Technologies

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DISCLAIMER

FOREWORD

In September 2015, Liberia, as a signatory to the UN Climate Change Convention, submitted the Nationally Determined Contribution (INDC) in advance of the new climate change agreement reached at the UN Climate Conference in Paris in December. Liberia's INDC was designed as a platform to integrate its Low Carbon Development Strategy into the country's long-term sustainable development Vision by 2030 (Agenda for Transformation). Liberia ratified the Paris Agreement in August 2018 and is working hard to revise its NDC for submission.

Regardless of the many contributions to climate change, Liberia, like many other developing countries, is especially vulnerable to its impacts. The country is at this moment susceptible to the adverse effects of climate change such as Shifting cultivation in the agriculture sector, unsustainable logging practices, unregulated coastal mining, high level of biomass consumption in the form of charcoal and fire wood for local energy use, and decreasing river flow due to high level of evaporation. The agricultural sector, which ensures the livelihoods of around 70% of the population remains vulnerable to flooding, erosion with changing rainfall patterns putting lives at risk in a country where nearly 8 out of 10 people do not have secure access to food. Current climate change vulnerability in Liberia include; increase in extreme events (e.g., exacerbated floods, extreme drought), sea level rise, flooding and coastal erosion being experienced on an annual basis that eats up the coast as observed in Monrovia, Buchanan and Greenville.

I would like to add that Liberia has an overall lack of energy. In most rural areas in Liberia, less than 5% of the population has access to electricity while most homes run mini generators. The current energy situation in Liberia is characterized by a dominance of traditional biomass consumption, low access to poor quality and relatively expensive modern energy services. It is estimated that over 95% of the population rely on firewood, charcoal, and palm oil for their energy needs.

The EPA of Liberia is overly happy with the level of the assessment done by the Technology Needs Assessment Team (TNA) through a national stakeholder's participatory process emulating from the identification and prioritization of environmentally sound technologies to the diffusion of these technologies to mitigate and adapt to climate change. We would like to recognize the United Nations Environment Programme (UNEP), DTU Partnership and Global Environment Facility (GEF).Your contributions have resulted in this rich source of information and we hope that this report will spur Parties into seeking out partnerships for the purpose of accelerating climate action and increasing ambition in Liberia.

Professor Wilson K. Tarpeh
EXECUTIVE DIRECTOR/CEO

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List of Acronyms and Abbreviations

AfDB	African Development Bank
BAU	Business As- Usual
CBL	Central Bank of Liberia
CBO	Community Based Organization
CC	Community College
CDA	County Development Agenda
COVID-19	Coronavirus Disease 2019
CPO	Crude palm oil
CSO	Civil Society Organization
CTCN	Climate Technology Centre & Network
CU	Cuttington University
EPA	Environmental Protection Agency
EU	European Union
FAO	United Nations Food and Agriculture Organization
FLY	Federation of Liberian Youth
GCF	Green Climate Funds
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIZ	Gesellschaft für Internationale Zusammenarbeit
GoL	Government of Liberia
IDPs	Internal Displaced Persons
ISFM	Integrated Soil Fertility Management
LACE	Liberia Agency for Community Empowerment
LLA	Liberia Land Authority
LERP	Liberia Economic Recovery Plan
LINSU	Liberia National Student Union
LMA	Liberia Marketing Association
LRA	Liberian Revenue Authority
MFDP	Ministry of Finance Development Planning
MGCSP	Ministry of Gender, Children, and Social Protection
MIA	Ministry of Internal Affairs
MICAT	Ministry of Information Culture Affairs & Tourism
MOA	Ministry of Agriculture
MOC	Ministry of Commerce
MOJ	Ministry of Justice
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organization
NPHIL	National Public Health Institute
PAPD	Pro-Poor Agenda for Prosperity and Development
SIDA	Swedish International Development Corporation Agency
TAP	Technology Actions Plan
TNA	Technology Needs Assessment
ToR	Terms of Reference
UL	University of Liberia
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

Acknowledgement

Working on Liberia's Technology Needs Assessment Reports I, II, & III have truly been exciting and a learning process for me. These reports could not be produced without the invaluable contributions of members of the Agriculture Technology Stakeholder Working Group: Mr Halala W. Kokulo, Mrs Charlene Jallah Freeman, Mr Harrison Luo, Mrs Gertie K. Sulunteh, Mr Stephen S. Gbondo, Mrs N. Mamatu Gbakoyah-King, Miss. Randa Moore, Mr Henry Tamba Nyuma, Mr Dephue Zuo, and Mrs Dorothy G. Sonkarlay and all of you that I did not mention your name here but contributed one way or the other. Let me as well appreciate Mr Christopher B. Kabah whose supervisory role was outstanding and kept our feet to the fire, and not forgetting about Professor Jerome G.N. Nyenka who was helpful throughout the reporting period. I dare not to also forget my colleagues, Dr Al Felix Hughes and E. Tenesee Wilson, both consultants working on the Energy and Coastal zone sectors for their technical supports and advice. I am forever grateful to the Environmental Protection Agency family for the opportunity granted me to serve. I also extend my appreciation to UNEP DTU Partnership Support Team for the technical and financial support that kept us moving to complete this task.

Finally, my special appreciation to my wife, Johnette M. Kannah for standing by me making sure that my coffee was always hot and ready to keep me up while writing my reports.

EXECUTIVE SUMMARY

Technology Needs Assessment (TNA) is a country-driven participatory process aiming to identify and prioritize environmentally sound technologies and practices. In the specific case of Liberia, the sector of concentration is agriculture, and it focuses on three adaptation technologies that were identified through a wide stakeholder's consultative process including (a) value addition to agriculture products (rice, cassava, vegetables, and fruits); (b) improved storage (drying and freezing of agriculture products); and (c) integrated soil fertility management.

Agriculture is the mainstay of the Liberian economy. For many years now, the agriculture sector continues to serve as a source of employment for about 70 percent of the rural population and has contributed greatly to the Liberian economy through Gross Domestic Product (GDP) and export earnings. However, agriculture productivity remains low due to traditional and domestic production of Liberia's main staple foods which still depend on a traditionally low input/low output, shifting cultivation, mixed crop system. Although agricultural production has increased in recent years, yields are still well below the regional average and the post-harvest loss rate very high.

Like phases I & II of the TNA assessment process, stakeholders were engaged both in a technical working session and one-on-one technical expert consultations. The summary tables for each of the technology were filled out along with the consultant and the measures were derived from TNA Barrier Analysis & Enabling Framework BA & EF report and were further broken down into actions.
During the stakeholder engagement, several targets were set for each technology. Below are the ambitions and benefits for arriving at these targets.

Value Addition Technology, by 2027, at least 30% of the farming population should have access to and start using this technology. The expected benefits include; reduction in unemployment of farming dependent population by at least 10% and increase Real GDP by 2.3%; enhancing food production capability of farming households; and increasing income for farmers and other beneficiaries along the value chain; reduction in Agricultural waste.

Additionally, for *Improved Storage technology*, the ambition is to have functional storage facilities constructed in Lofa, Bong, Nimba, Grand Kru, Maryland, Sinoe and Upper Montserrado by 2027. And the anticipated benefits include impacting the most vulnerable people and communities; reducing spoilage of food and prolong its availability; complementing income generation for households; and reducing the incidence of contaminating food consumption.

Lastly, for *Integrated Soil Fertility Management Technology*, the ambition is to have 4 Integrated Soil Fertility Management facilities in place to help Liberia meets its overall climate actions by reducing deforestation and improving farming practices for all the 15 counties by 2025. And the benefits include guaranteeing the availability of food crops for rural people; improving farmer's income levels and bringing about economic stability; and helping reduce the cutting down of forested areas thereby allowing for Biodiversity Conservation.

Concerning the Project Ideas (PIs) for the TAP, below are the three recommended PIs for Liberia's Agriculture sector that was carefully identified following the retained technologies by the Agriculture Technical Working Group.
The project ideas for each of the technology are as follow:

1. Establish 3 major facilities for value addition of agricultural products (rice, cassava, vegetables, and fruits). The facilities will be built within the agro-ecological zones of Liberia to serve 5 counties each.
2. Introduction of Improved Storage (drying & freezing) – is to build 3 storage facilities for seeds, grains, and vegetables in 3 agro-ecological zones of Liberia: and
3. Introduce and run at least 4 Integrated Soil Fertility Management facilities in four agro-ecological zones of Liberia.

Below are the overview tables for the three agriculture technologies depicting actions, activities, sources of funding, timeframe, risk, project monitoring, success criteria and budget.

Table 1: TAP Overview Table for Value Addition Technology

Sector	Agriculture							
Sub-sector	Food Sector							
Technology	Value Addition Technology							
Ambition	By 2027, at least 30% of the farming population should have access to and start using this technology.							
Benefits	Reduction in unemployment of farming dependent population by at least 10% and increase Real GDP by 2.3%. Enhancing food production capability of farming households. Increased income for farmers and other beneficiaries along the value chain. Reduction in Agricultural waste.							
Action	Activities to be implemented	Sources of funding	Responsible body and focal point	Time frame (Yr)	Risks	Success criteria	Indicators for Monitoring of implementation	Budget per activity (US$)
Revised the PAPD and modalities to include fin incentives for local entrepreneurs	1.1 Engagement with the departments of economic policy and development planning at the ministry of finance to mainstream financial incentives for local entrepreneurs into the LERP.	CTCN, EU, World Bank, AfDB, GEF, FAO, and GoL,	EPA, Ministry of Agriculture, MFDP, CDA, and MOC	0-2 yrs.	The delay in the revision of the PAPD and LERP. Inadequate funding will pose a serious risk to the implementation of this action. The reluctance of the government to prioritize such an initiative.	PAPD and LERP were revised, finalized, and approved by the cabinet and the legislature. Incentive packages concluded and widely accepted by beneficiaries.	The number of entrepreneurs benefiting from the incentive packages.	75,000
	1.2 Develop the financial incentive packages.	USAID, FAO, UNDP, GoL, Golden Veroleum, Firestone and Arcelor Mittal	EPA, MOA, MIA, LLA,	1-4 yrs.	In-availability of predictable funding windows to support the development of the financial incentive.	Active coordination taking amongst stakeholders. Wider dissemination and use of	Entrepreneurs appreciably financed and thereby technology in operation.	100,000

						research findings from research and training institutions.		
	1.3 Submit the financial incentive package to MFDP and raise awareness.	GEF, GoL, FAO, AfDB	MOA, EPA, MFDP	2-6	Delay in the disbursement of funds by partners or GoL.	Well demonstrated by a minimum of one donor institution.	15 pieces of training conducted per year (one training per county). The percentage of people with knowledge of the value addition technology increased.	10,000
Initiate policy intervention in (doing-business protocol) exemption or downward adjus tariff on related materials/equip around value addition technology	2.1 Engage the National Business Climate Forum to integrate tax adjustment and exemption into its processes.	GoL, CTCN, USAID, SIDA	EPA, MOA, MFDP, MOC	0-1.5	Lack of proper coordination could pose a serious risk. Delay in disbursement of funds by donors or GoL.	Tariff reduction scheme in place.	The number of persons importing materials/equipment around value addition.	25,000
	2.2 Incorporate this provision into doing- business regulations.	GoL, CTCN, USAID, SIDA	EPA, MOA, MFDP, MOC	0-1.5	Lack of proper coordination could pose a serious risk. Delay in disbursement of funds by donors or GoL.	The provision is incorporated into the doing-business regulations.	The implementation of this provision by custom officers.	25,000
Secure or provide scholarships to 30 personnel per year working sector institutions in the techn (consider gender balance).	3.1 Develop selection criteria or checklist, call for application and final list of qualified candidates.	FAO, USAID, SIDA, GoL	EPA, MOA, MOE, MFDP, UL	0-1	Lack of proper coordination could pose a serious risk. Delay in disbursement of funds by donors or GoL.	The selection criteria or checklist developed.	The number of applications received using the selection criteria.	15,000

	3.2 To identify training institutions in the specific area under consideration.	GoL, GEF, UNDP, FAO	EPA, MOA, MOE, MFDP	0-1	Difficulty in acquiring funds to implement this activity.	Training institutions identified.	The number of interested institutions.	10,000
	3.3 Draw up a budget and seek funding from multiple sources.	GoL, UNDP, FAO, USAID, GEF	EPA, MOA, MOE, MFDP, UL	0-1.5	Difficulty in acquiring funds to implement this activity. Limited qualified individuals to develop proposals.	Submission of proposals and budget.	The approval of the proposals.	25,000
Develop flexible loan scheme enterprises. Provide 3 major facilities for addition of agricultural products cassava, vegetables and fruits) i agro-ecological zones of Liber serve 5 counties each.	4.1 Prepare a detailed loan scheme	GoL, UNDP, USAID	EPA, MOA, MFDP, MOC	1-2	Difficulty in acquiring funds to implement this activity.	The loan scheme developed.	The number of enterprises accessing loans.	25,000
	4.2 Identify financial, lending and borrowing institutions for the potential provision of loans.	GoL, UNDP	EPA, MOA, MFDP, MOC	1-2	Difficulty in acquiring funds to implement this activity.	Lending and borrowing institutions identified.	Loans provided by the institutions.	15,000
	4.3 Set eligibility criteria for accessing the loan.	GoL, FAO	EPA, MOA, MFDP, MOC, UL	0-1	Difficulty in acquiring funds to implement this activity.	Eligibility criteria in place.	The implementation of the eligibility criteria.	5,000
	4.4 Site identification and land acquisition	CTCN, GCF, FAO, GEF, GoL	EPA, MOA, MFDP, LLA, MOJ	1-3	Difficulty in acquiring funds to implement this activity. Suitability of the site.	Site identified and land purchased.	The available parcel of land and other supporting documents.	90,000
	4.5 Procure and deliver facilities to pre-determined sites.	GCF, SIDA, USAID, FAO, GoL	EPA, MOA, MFDP, LACE	0-5	Difficulty in acquiring funds to implement this activity.	Three value technology facilities are constructed	The running and operation of the facilities.	6,000,000

					Delay in the procurement of materials.	and equipped and sustained.		
Amend, repeal or develop law regulations Agricultural Technologies.	5.1 Engage relevant key committee members on the environment and natural resources in the house of parliament to amend, repeal or develop laws and regulations for Agricultural Technologies.	GoL	EPA, MOA, MFDP,	0-1	Difficulty in getting the attention of the committee members.	Committee agreed to develop a Bill for onward submission to the house of parliament.	vas introduced to the	20,000
	5.2 Organize a series of workshops with policy makers about the importance of amending, repealing or developing laws that favour the deployment and diffusion of this technology.	GoL	EPA, MOA, MFDP	0-2	Coordination and consensus amongst lawmakers. Political interest and lobbying.	The passage of the bill by the house of parliament.	implementation and cement of the law.	100,000
	5.3 Engage CSOs to increase advocacy for the passage of the bill.	UNDP	EPA, MOA, FLY, LINSU.	0-1	Difficulty in acquiring funds to implement this activity. Lack of Interest from CSOs.	The passage of the bill.	implementation and cement of the law.	20,000
Ensure at least 30% of slots to w institutions and CBOs involve e and disadvantaged populations.	6.1 Identify and document women institutions and CBOs involved with the elderly and	P, USAID, SIDA, GoI	EPA, MOA	1-2	Difficulty in acquiring funds to implement this activity.	Women institutions and CBOs identified and documented.	umber of elderly and vantaged people ed to.	10,000

	disadvantaged population.							
	6.2 Conduct training for women-led institutions and CBOs to be able to use and maintain the technology.	CTCN, UNDP, GoL	EPA, MOA, UL	0-1	Difficulty in acquiring funds to implement this activity.	The availability of training materials. Training conducted	umber of women-led tions and CBOs d.	65,000
	6.3 Create a knowledge-sharing platform for women institutions and CBOs involved with the elderly and disadvantaged population.	P, FAO, USAID, GoL	EPA, MOA, MICAT	0-1	Difficulty in acquiring funds to implement this activity. Hosting and maintenance of the website	The available knowledge-sharing platform.	umber of information l on the platform.	25,000
Work with the Liberian Mark Association national and structures to develop training pac for marketers.	7.1 Assess at the national and local level the knowledge and capacities of the LMA staff to determine the kind of training packages to be developed.	N, USAID, GEF, FAO	EPA, MOA, UL	1-3	Difficulty in acquiring funds to implement this activity.	Availability of the assessment report	umber of markets and es assessed.	110,000
	7.2 Develop training packages for marketers.	N, USAID, GEF, FAO	EPA, MOA, MOE, MFDP	0-1	Difficulty in acquiring funds to implement this activity.	Training packages available.	ategorization of the g packages.	45,000
	7.3 Roll out the training modules for marketers.	N, USAID, GEF, FAO	EPA, MOA, MOE, MFDP, UL	0-1	Difficulty in acquiring funds to implement this activity.	The number of marketers trained.	number of trainings cted.	230,000
	Grand Total							**8,349,000**

Table 2: TAP Overview Table for Improved Storage Technology

Sector	Agriculture							
Sub-sector	Food Sector							
Technology	Improved Storage Technology							
Ambition	Functional storage facilities constructed in Lofa, Bong, Nimba, Grand Kru, Maryland, Sinoe and Upper Montserrado by 2027							
Benefits	- Impact most vulnerable people and communities - Reduce spoilage of food and prolong its availability - Compliment income generating for households - Reduce the incidence of contaminating food consumption							
Action	Activities to be implemented	Sources of funding	Responsible body and focal point	Time frame (Yr)	Risks	Success criteria	Indicators for Monitoring of implementation	Budget per activity (US$)
Adequate budgetary allocation for the development of the Technology.	1.1 Prioritize the subsector in national budgeting and planning processes.	GoL	EPA, MOA, MFDP	0-1	Low political will on the part of GoL to prioritize the subsector.	Subsector adequately captured in the national planning process.	The sector is functioning consistently with the TAP objective.	5,000
	1.2 Explore additional local sources of funding within the private sector.	UNDP, FAO, GoL	EPA, MOA, MFDP	0-1	Bottlenecks and or delay in securing funds.	The will of the private sector is fully invited.	At least three private-sector institutions are committed to providing predictable funding.	10,000
Ensure reduce taxes on research instruments, and other necessary materials used for the development of the technology.	2.1 Make the case either at the doing-business forum or the national budget process for a tax incentive in the procurement of materials and instruments used in the implementation of the technology.	GoL	EPA, MOA, MFDP	0-1	The inadequate political will to support the initiative. Reluctance on the part of decision-makers to buy into the technology.	Contact established with Business Climate Forum and opportunity provided to make the case for the tax incentive.	10-15% reduction in tax associated with the importation of materials and equipment used in the technology.	5,000
Foster public-private partnership in research and development of the technology.	3.1 Identify appropriate private entities with capacity and specific programs related to the technology.	GoL	EPA, MOA, MFDP	0-1	Lack of interest from the private sector.	Several private entities are documented to having capacity	At least three private entities signed onto participating in the implementation of the technology.	5,000

						in the technology.		
	3.2 Draw-up an MOU specifying the duties and responsibilities of parties involved in the partnership.	GoL	MOA, EPA, MFDP, NIC	0-1	Impediments with wider acceptability of parties with terms and conditions of MOU.	MOU drew up and produced.	Four private institutions signed onto the MOU.	5,000
Provide strategic facilities for improved storage.	4.1 Introduction and popularization of Improved Storage technology.	USAID, FAO, UNDP, GoL	EPA, MOA, MFDP	1-2	Inadequate public education and awareness.	Popularization plan and strategy of the technology drawn up.	Up to 80% of the farming population have access to and using the technology.	10,000
	4.2 Procure and deliver (drying & freezing) equipment particularly for storage of seeds, grains, and vegetables in 3 agro-ecological zones of Liberia.	GCF, EU, GIZ, AfDB, WB, USAID, GoL	EPA, MOA, MFDP, UNDP, FAO	1-4	Difficulty in selecting and securing final hosting sites. Delay in securing funds.	Materials are procured.	3 facilities (drying & freezing) materials delivered to beneficiaries and in use.	2,250,000
Strengthen institutional capacity of agriculture research.	5.1 Conduct needs assessment of capacity gaps at the institutional level in agriculture research.	GoL	EPA, MOA, MFDP	0-1	Inadequate political and weak momentum.	Report of needs assessment available.	Institutional capacity needs and gaps identified.	5,000
	5.2 Address the identified gaps from the needs assessment and capacitate institutions working in agriculture research.	GoL, GIZ, UNDP, GEF, FAO, AfDB	EPA, MOA, MFDP, UNDP, GIZ	1-2	Delay in securing funding.	Gaps are identified.	75% of the institution working in agriculture research are capacitated to support the implementation of the technology.	40,000
Mainstream principles and practice of improved storage technology in existing agriculture programs.	6.1 Develop modules covering specific areas in improved storage technology.	FAO, UNDP, GoL	EPA, MOA, MFDP, UNDP	0-2	Limited human resource capacity.	Modules on Improved Storage developed.	85% of the beneficiaries are acquired skills in the implementation of the technology.	25,000

	6.2 Identify and recruit resource persons in the training of the modules.	GoL	EPA, MOA, MFDP	0-1	Limited human resource capacity.	The resource was identified and placed into a compendium of experts.	25 resource persons prepared to conduct training.	4,500
Develop occupational health and safety measures that are women sensitive.	7.1 Hire a consultant to develop an occupational health and safety measures module favourable for women.	GoL	EPA, MOA, MFDP	0-1	Limited human resource capacity.	Consultant hired.	Occupational health and safety modules screwed to women specificities developed.	4,500
	7.2 Roll out the module and create a nationwide education and awareness about women issues in the working environment	GIZ, AfDB, UNDP, WB, GoL	EPA, MOA, MFDP, UNDP, FAO, WB, GIZ	1-4	Delay in securing funding.	Module sensitivity to women issues in the working environment developed.	400 women across all agro-ecological zones engaged.	75,000
Incorporate safeguards that disallowed gender-based offences and abuse in the work setting.	8.1 Work with the ministry of gender to incorporate safeguards in the handbook of institutions and companies that disallowed gender-based offences and abuse in the work setting.	GIZ, AfDB, UNDP, WB,GoL	EPA, MOA, MFDP, UNDP, FAO, WB, GIZ	1-2	Delay in securing funding.	Contact with Gender Ministry established to incorporate safeguard on gender-based offences and abuse in the handbook of institutions and companies.	80% of targeted institutions incorporate safeguards on gender-based offences and abuse in the handbook of institutions and companies.	50,000
Provision of incentives to encourage persons with disabilities and other disadvantaged youths and the elderly to fully participate.	9.1 Identify and list beneficiaries to benefit from the incentive package.	GoL	EPA, MOA, MFDP	0-1	Partial identification of beneficiaries.	List of beneficiaries developed and documented.	85% of identified beneficiaries have access to incentive package.	4,500
	9.2 Procure and made available specialised tools that can be used by persons with disabilities and other disadvantaged youths and	GIZ, CTCN, USAID, AfDB, UNDP, WB,GoL	EPA, MOA, MFDP, UNDP, FAO, WB, GIZ	2-4	Delay in securing funding.	Tools that can be used by persons with disabilities and other disadvantaged	Tools that can be used by persons with disabilities and other disadvantaged youths and the elderly are ready to be distributed.	400,000

	the elderly to fully participate.					youths and the elderly are procured and available.		
	9.3 Distribute tools to the beneficiaries.	GIZ, AfDB, UNDP, WB, CTCN, USAID, GoL	EPA, MOA, MFDP, UNDP, FAO, WB, GIZ	3-4	Delay in procurement or availability of tools.	Plan to distribute tools that can be used by persons with disabilities and other disadvantaged youths and the elderly developed.	Tools that can be used by persons with disabilities and other disadvantaged youths and the elderly are distributed and in use.	100,000
	Grand Total							**2,998,500**

Table 3: TAP Overview Table for ISFM Technology

Sector	Agriculture							
Sub-sector								
Technology	INTEGRATED SOIL FERTILITY MANAGEMENT							
Ambition	4 Integrated Soil Fertility Management facilities are in place to help Liberia meets its overall climate actions by reducing deforestation and improving farming practices for all 15 counties by 2025.							
Benefits	- Guarantees the availability of food crops for rural people. - Improve farmer's income level and bring about economic stability. - It helps to reduce the cutting down of forested areas thereby allowing for biodiversity Conservation.							
Action	Activities to be implemented	Sources of funding	Responsible body and focal point	Time frame (year)	Risks	Success criteria	Indicators for Monitoring of implementation	Budget per activity (US$)
Prioritize adequate budgetary allocation at sector-specific and national levels for the development and management of the technology.	1.1 Make adequate budgetary allocation in support of the development and implementation of the technology.	GoL	EPA, MOA, MFDP	0-1	Low recognition of the sector agencies during national planning and budgeting processes. Frequent relegation of the	The sector is recognized and actively participating in the national budgeting and planning processes.	The allocation was made for the deployment of 4 facilities to host the ISFM technology.	5,000

					sector during prioritization.	The sector is brought to center stage at the national level.	The facilities are visible and accounted for.	
	1.2 Consider additional funding sources locally besides national budgetary processes.	GoL	EPA, MOA, MFDP	1-2	Reluctance on the part of national-level stakeholders and institutions.	Potential national funding sources were identified and catalogued.	At least three national funding institutions expressed interest and providing predictable funding.	4,500
Provide economic incentives to the attractive private sector and community participation.	2.1 Encourage public-private partnership for the implementation of the technology.	GoL	EPA, MOA, MFDP	0-1	Failure to adequately invite the will of key private sector players to a national dialogue for PPP meeting.	Ongoing PPP discussions at the national level.	MOU drafted, disseminated, and widely accepted. At least 5 private sector institutions signed onto the MOU.	15,000
Provide and keep functional 4 Integrated Soil Fertility Management facilities in four agro-ecological zones of Liberia.	3.1 Identify the sites and acquisition of land suitable to host the facilities.	UNDP, GIZ, GoL	EPA, MOA, MFDP, UNDP, GIZ	1-2	Reluctance on the part of the communities to make private land available for public facilities.	The sites are identified, and negotiations are ongoing for the acquisition and use of said land,	4 sites acquired and ready for use.	24,000
	3.2 Procure and install the Integrated Soil Fertility equipment in the 4 agro-ecological zones of Liberia.	UNDP, FAO, GIZ, USAID, AfDB, CTCN, EU, GoL	EPA, MOA, MFDP, UNDP, FAO, GIZ, USAID, AfDB, CTCN	1-5	Delay in securing funding or donor fatigue.	Materials/equipment are procured and available for use.	4 Integrated Soil Fertility facilities are constructed in 4 agro-ecological zones of Liberia.	2,800,000

Develop appropriate policy, legal and regulatory prescriptions for the development of the Technology.	4.1 Identify policy gaps impeding the development and transfer of the technology.	GoL	EPA, MOA, MFDP	0-1	Limited national human capacities.	Terms of reference developed, and Resource persons hired.	Policy gaps identified and documented.	5,000
	4.2 Revised and or promulgate policy and laws to facilitate the development and improvement of the technology.	GoL	EPA, MOA, MFDP	1-3	Lack of political will to revise the law.	Several policies and laws were drafted and ready for enactment.	At least three existing and laws are revised, and two new ones are promulgated.	4,500
Provide and or increase financial support to relevant institutions for enhancing their capacity to manage the development of the technology.	5.1 Conduct capacity needs assessment of institutions identified to be implementing the technology.	UNDP, GoL	EPA, MOA, MFDP	0-1	Delay in securing funding to conduct a needs assessment.	Institutional needs assessment concluded, and gaps identified.	Actions to fill gaps elaborated and documented.	5,000
	5.2 Provide soft loans as an incentive to keep the technology in operation.	GIZ, AfDB, WB, EU, UNDP, USAID, GoL	EPA, MOA, MFDP, GIZ, AfDB, WB, EU, UNDP, USAID	1-2	Lack of adequate funding.	Loan criteria developed and terms and conditions negotiated.	At least 5 institutions access funding and are capacitated and functional.	500,000
Carry out effective education and awareness on the benefits of the technology.	6.1 Develop educational and awareness modules in the use of the technology.	GoL	EPA, MOA, MFDP	0-1	Delay in securing funding.	Resource person hired to develop the education and awareness modules.	Public education and awareness modules developed.	4,500
	6.2 Provide technical and financial support for training in the use of the technology.	UNDP, EU, USAID, GIZ, AfDB, WB, GoL	EPA, MOA, MFDP, UNDP, USAID, WB, GIZ, EU	1-2	Delay in securing funding.	Training package developed and available for use.	At least four communities each within the 4 agro-ecological zones reached out to.	250,000

Consider traditional knowledge to enhance soil fertility.	7.1 Survey, assess and document available and known traditional knowledge in soil fertility management.	GoL	EPA, MOA, MFDP	1-2	Reluctance on the part of traditionalists to share their knowledge.	Develop terms of reference and hire a team of consultants to conduct surveys.	Known and available traditional knowledge in soil fertility management documented.	125,000
	7.2 Develop protocols for the safe integration of identified traditional knowledge into existing scientific pools.	UNDP, FAO, GoL	MOA, EPA, MIA, MFDP, UNDP	0-1	Potential debates over methodological approaches.	Organize joint traditional-scientific forums for the inclusion of traditional knowledge into existing scientific pools.	Appropriate traditional knowledge validated, approved, and included in existing scientific pools.	30,000
	7.3 Popularize the identified traditional knowledge for wider use.	GIZ, UNDP, GoL	MOA, EPA, MIA, MFDP, UNDP	1-2	Delay in securing funding.	Develop terms of reference and hire a national consultant to develop awareness-raising modalities.	Awareness-raising package developed and implemented in at least four communities each within the 4 agro-ecological zones	25,000
	Grand Total							**3,797,500**

In this light, the ambitions, and targets of the TAP; there were some cross-cutting issues/ barriers identified across the three technologies that could impede their ambitions and targets. However, some enabling cross-cutting measures to address the issues and the means to possibly adopt, transfer and diffuse these technologies were as well identified and are hereby summarized in table1 below.

Table 4: Summary of Crosscutting Issues and their proposed enabling measures

Crosscutting Barrier Category	Crosscutting Barrier	Technologies	Crosscutting Enabling Measures
Economic & Financial	High capital cost, for installation, operation, and maintenance costs. Lack of incentives in the form of soft loans and subsidies.	Improved Storage (dry & Freezing Technology Value addition (Rice, Cassava, Vegetables & Fruits) Technology ISFM Technology	Through national budget allocation and grants, these technologies can be set up from the beginning. Also, the needed capacity can build.
Institutional arrangement and capacity	Limited institutional capacity. Weak capacity of training & research.	Improved Storage (dry & Freezing Technology Value addition (Rice, Cassava, Vegetables & Fruits) Technology ISFM Technology	Establish a technology focal point in each line ministry and agency of government that will report directly to the minister or director. The head of the technology focal points should be seated in the president's office.
Policy, legal and regulatory	Inadequate policy for agricultural technology Lack of legal framework Lack of enforcement	Improved Storage (dry & Freezing Technology Value addition (Rice, Cassava, Vegetables & Fruits) Technology ISFM Technology	Enact laws specifically for agricultural technologies that meet international best practices and standards. Reduce tax on agricultural equipment and encourage law enforcement.
Gender and other socio-cultural issues	Lack of recognition of women, disadvantaged youths and elderly.	Improved Storage (dry & Freezing Technology Value addition (Rice, Cassava, Vegetables & Fruits) Technology ISFM Technology	Through the local government, involve communities from the very beginning to participate in the decision-making process. To ensure interventions conform harmoniously with existing cultural practices and norms
Information & Awareness	Insufficient data sharing and collaboration among relevant institutions.	Improved Storage (dry & Freezing Technology Value addition (Rice, Cassava, Vegetables & Fruits) Technology ISFM Technology	Improved education and awareness rising. Involve local community radio stations, farmers Field Schools, Farmers corporative, social clubs. Use local vernaculars to disseminate information.

Chapter 1: Technology Action Plan and Project Ideas for the Agriculture Sector

1.1 TAP for the Agriculture Sector

1.1.1 Sector overview

The selection of the agriculture sector to form part of Liberia's TNA was based on its importance to the Liberia economy and the prevailing impacts of climate change on the sector. In Liberia, the agriculture sector provides livelihood and sustenance for more than 60 percent of the population that engaged in the production of rice, cassava, rubber, cocoa, and sugarcane (CBL, 2019). Additionally, it contributes about 39.11 percent to GDP and provide employment opportunities for about 30,000 people employed by commercial rubber farms and up to 60,000 smallholder households involved with growing rubber trees (CBL, 2019; World Bank, 2019).

However, agriculture productivity remains low due to traditional and domestic production of Liberia's main staple foods, which still depend on a traditionally low input/low output, shifting cultivation, mixed crop system (MOA, 2019). Although agricultural production has increased in recent years, yields are still well below the regional average and the post-harvest loss rate very high. As a result, the country imports 80 percent of its staple food (rice), making it vulnerable to global food price volatility (CBL, 2019). All of these are due to poor integration, lack of basic infrastructures such as machines, farming equipment/tools, farm to market roads, fertilizers, pesticides, and most importantly food storage capacity (MOA, 2019, CBL, 2019).

Liberia's greenhouse gas (GHG) emissions are about 1.32 million tonnes (Hannah and Max, 2020). The agriculture sector accounts for about 31.9 percent of GHGs emissions in Liberia. The sector has been selected as well to form part of Liberia Nationally Determined Contributions (NDCs) on the adaptation side (EPA, 2021). In the revised NDC, the country has committed to reducing its economy-wide greenhouse gas emissions by 65 percent below the projected business-as-usual (BAU) level by 2030 through a combination of the following: unconditional 10 percent resulting in an absolute emissions level of 11,187Gg CO_2e in 2030; with an additional 55 percent conditional upon international support, which would result in absolute emissions level of 4,350Gg CO_2e in 2030 (EPA, 2021).

According to the population census conducted in 2008, the population of Liberia is 3.5 million people (LISGIS, 2008). Women constitute over 60 percent of agricultural labour. They contribute 76 percent of labour to cash crop production, 93 percent to food crop production and 85 percent of all labour for marketing and trading (FAO, 2018). The country main cash crops and foreign exchange-earners are rubber, cocoa, and timber. However, rubber is known to be one of the dominant sources of revenues generated in the agriculture sector, accounting for 17.5 percent of the total export receipts in 2017 (CBL, 2019). Besides rubber, another significant cash crop is oil palm, which has traditionally been produced for the domestic market. A few years back, there has been considerable interest from both smallholders and large investors in expanding export production. However, land tenure in Liberia is a major barrier for potential oil palm farmers and investors (CBL, 2019).

With this challenge, the stakeholders in the oil palm sector include smallholder farmer cooperatives, individual farmers, large multinational corporations, and concessionaires, as well as individuals playing various intermediation roles and support services (MOA, 2019). Besides land tenure, another obstacle to investment in the sector is the lack of capital and professional expertise to increase farm productivity (MOA, 2019; CBL, 2019). Additionally, agriculture productivity remains low due to traditional and domestic production of Liberia's main staple foods, which still depend on a traditionally low input/low output, shifting cultivation, mixed crop system. Although agricultural production has increased in recent years, yields are still well below the regional average and the post-harvest loss rate very high. As a result, the country imports 80 percent of its staple food (rice), making it vulnerable to global food price volatility (CBL, 2019). All of these are due to poor integration, lack of basic infrastructures such as machines, farming equipment/tools, farm to market roads, fertilizers, pesticides, and most importantly food storage capacity (MOA, 2019, CBL, 2019).

Worst of all, COVID-19, has further frustrated the efforts put in the agriculture sector. The Central Bank of Liberia (CBL) report states that the agriculture & forestry subsectors have shown a downward trend in the economy with deterioration in average output (CBL, 2020). According to the report, rubber production fell by 6.7 percent to 63,734

metric tons, from a revised 68,285 metric tons reported in 2019 because of a decrease in a harvest of smallholders' farms induced by the lockdown (CBL, 2020). The report further stated that cocoa output in 2020 amounted to 5,916 metric tons, indicating a decline in production, from a revised 9,997 metric tons produced in 2019. The decline in output was mainly due to an unfavourable harvest coupled with the impact of the health crisis. The production of crude palm oil (CPO) decreased by 265 metric tons to 22,200 metric tons, from a revised 22,465 metric tons produced a year ago mainly due to limited labour mobility induced by the restrictive measures to contain the COVID-19. Total round logs produced during the year fell by 43,253 cubic meters, from an estimated 698,657 cubic meters during 2019, reflecting COVID-19 induced labour disruption and weak global demand. Sawn timber output was estimated to decline to 169,097 pieces in 2020, from an estimated 409,655 pieces produced in 2019 (CBL, 2020). See the below table.

Table 5: Agriculture and Forestry Outputs (2018-20)

Commodity	**Unit**	**2018**	**2019+**	**2020****
Rubber	Mt.	46,810	68,285	63,734
Cocoa Bean	Mt.	18,871	9,997	5,916
Crude Palm Oil (CPO)	Mt.	18,104	22,465	22,200
Round Log	M3	244,578	698,657*	655,404
Sawn Timber	Pcs.	262,753	409,655*	169,097

Source: Central Bank of Liberia (CBL) 2020
+ Revised/Actual,
** Projection,
*Estimate

This third TNA report on the Technology Action Plan (TAP) is built around three technologies (Value Addition, Improved Storage, and Integrated Soil Fertility Management) prioritized by stakeholders in the first round of the TNA process. The preliminary targets identified under the TNA project that the government of Liberia will try to seek and leverage support for the transfer and diffusion of these technologies in the agriculture sector. This is evidenced by the inclusion in its NDC a measure to develop facilities and technologies to promote climate-resilient postharvest and value addition practices, including the establishment of 5 seed/gene banks and improved storage facilities for agricultural products, based on Liberia's five agricultural regions, by 2030.

Based on the above, the following are considered for each of the technology:

A. Establish 3 major facilities for value addition of agricultural products (rice, cassava, vegetables, and fruits). The facilities will be built within the agro-ecological zones of Liberia to serve 5 counties each.
B. Introduction of Improved Storage (drying & freezing) – is to build 3 storage facilities for seeds, grains, and vegetables in 3 agro-ecological zones of Liberia: and
C. Introduce and run at least 4 Integrated Soil Fertility Management facilities in four agro-ecological zones of Liberia.

Table 6: Existing policies related to Agriculture Sector's development and Technology Deployment in Liberia

Name of the policy	**Main contents**	**Remarks on technologies**
Food and Agriculture Policy and Strategy 2008	This policy intends to address the superfluity of problems that have historically affected agriculture and its linkages to the other sectors in a coherent, consistent, and forward-looking manner. It presents a pro-poor and pro-growth framework to transform the sector from the perennial state of subsistence to one of sufficiency.	Establishing agricultural Market Information Services; rehabilitating markets; constructing storage and processing facilities; building capacities of marketing bodies; meeting requirements to enter external markets.
National Food Security and Nutrition Strategy 2009	This policy prioritizes the need for food for insecure and nutritionally vulnerable groups in the Liberian society, including the elderly who have little support, female-headed households, orphans, and HIV-affected individuals. The policy addresses four separate	

	dimensions of food security: food availability, access to food, utilization, and vulnerability.	
Liberia Agriculture Sector Investment Program 2009	This policy seeks to transform Liberian agriculture by maximizing the sector's contribution to national economic growth, employment and income generation, food and nutrition security, and poverty reduction.	Develop, train, and adopt productivity enhancement technologies including propagation and use of high-quality seeds, seedlings, and fingerlings.
Integrated Water Resources Management Policy 2009	The policy covers two broad areas: water resource management and water resource use. The goals are to ensure: (i) full socio-economic benefits for present and future generations; (ii) access to safe and adequate water for the people; (iii) the availability of quantity and quality of water for the environment and ecology; (iv) the availability of sufficient quantity and quality of water for food security; (v) the availability of water for other uses such as hydropower generation, industry, transportation, recreation.	Mitigation of natural disasters and the effects of climate change are among the goals of the policy.
The New Policy for Agricultural Advisory Services of 2009	This policy encourages the development of a pluralistic, decentralized, demand-driven, and market-oriented system of the Agricultural Extension and Advisory Services that incorporate cross-cutting issues of priority to the people and Government of Liberia.	Building capacities of extension officers attempting to pass on new technologies.

1.1.2 Action Plan for Technology 1: Value Addition Technology

1.1.2.1 Introduction

During the prioritization of technologies, Value Addition Technology won the hearts of the stakeholders and was ranked as the number one technology to improve the agriculture sector which is faced with severe climate change impacts. The stakeholders recognized that to adapt to the impacts of climate change in the agriculture sector, there is a need to adopt environmentally sound technologies to move towards a climate-resilient development pathway beyond the production of agricultural products. Besides, value-added technology as it has been tested in other parts of the world brings lots of social, economic, and environmental benefits. The good about this technology is that it can be easily used by male or female farmers and producers of agricultural products. This technology will help improve the income of producers and sellers of agricultural products. Additionally, it has a higher market potential as there is a greater need to save time and money.

Even though this technology is somewhat new to Liberia, it will require the Environmental Protection Agency of Liberia, the Ministry of Agriculture, the Ministry of Finance and Development Planning and the Ministry of Health to work hand–in–hand to implement this technology. It is anticipated that this technology will create more jobs and put food on the table of poor farming households in Liberia.

1.1.2.2 Ambition for the TAP

The goal and objective for the deployment and diffusion of Value Addition Technology in Liberian society are to guarantee the availability of food crops all year round especially for rural farmers. Additionally, is to ensure farmer's incomes and savings are improved. Achieving these objectives will require the involvement of key national stakeholders such as policy makers, county Superintendents, the ministry of Agriculture, regional agriculture coordinators and extension officers. Other relevant actors include technical institutions, the University of Liberia, and Cuttington University. Other groups that are important in this process include Agricultural NGOs, the Civil Society Organizations all of whom will play roles in achieving the transfer, diffusion, and sustainability of this technology throughout the country. Gender mainstreaming should be at the core of the implementation of this technology.

1.1.2.3 Actions and Activities Selected for Inclusion in the TAP for Value Addition Technology

Summary of barriers and measures to overcome barriers

The actions and activities for inclusion were selected from the measures identified to overcome the barriers to the diffusion of this technology. The barriers were identified through stakeholder's consultations and expert inputs using logical problem analysis and market mapping. The actions and activities were prioritized for inclusion in the TAP. *See below table 7:*

Table 7: Summary of barrier and measure for Value Addition Technology

Value Addition		
Categories	**Identified Barriers**	**Measures**
Economic and financial	The attendant cost of securing machinery, equipment, improved planting materials;	Provision of subsidy to local small and medium scale entrepreneurs to ease their burden of liquidity deficits and make them more financially viable in pursuing their investment objectives thereby contributing to the advancement of the industry. Consider reducing import duties on inputs, materials, equipment, and accessories being brought in-country in order to encourage wider stakeholders' participation and incentivize them to keep technology viable and sustainable.
	Cost of maintaining high level trained human resources.	Take appropriate policy actions to ensure financial and lending institutions provide reduced interest rates or even free-interest loans to firms, entities and entrepreneurs with proven and predictable needs and desire for purchasing implements.
	Lack of economic incentives in terms of subsidies to driving the technology.	Supply and install associated facilities and equipment on farms to shift the burden off local investors or entrepreneurs that may endeavour into the industry.
	A deficit in infrastructure and facilities to diffuse and transfer the technology.	Establish 3 major facilities for value addition of agricultural products (rice, cassava, vegetables, and fruits). The facilities will be built within the agro-ecological zones of Liberia to serve 5 counties each.
Non-financial:		
Policy, legal and Institutional:	Inadequate policy, legal and regulatory framework.	Revisit existing policies, laws, and strategies to conform them to current realities.
	Incoherent strategies in the implementation of agriculture value-addition;	Promulgate where appropriate new strategies.
	Lack of technical and human resource capacities.	The government should ensure existing policies and strategies appertaining to said technologies are implemented.
	Weak national institutions to manage the technology.	Conduct needs assessment in institutions to identify material gaps.
Gender and other social-cultural issues:	Limited recognition of women participation in value addition	Improve outreach initiatives to women, the elderly and the disadvantaged population.
	Lack of training and marketing and tariff information for women	Provide requisite training for women in marketing.
	Other vulnerable groups that have emerged, such as IDPs, disadvantaged youths and the elderly are not regularly reached out to;	Disseminate tariff information and involve women in the negotiation of same.
	Lack of incentives to attract a potential labour force.	Conduct a labour force survey to ascertain remuneration as appropriate.

1.2.2.4 Actions Selected for inclusion in the TAP

As per the Value Addition Technology, actions selected for inclusion in the TAP are based on the measures indicated in Table 7, that were derived from Liberia's second TNA report on barrier analysis. This section provides a comprehensive list of actions to be included in the TAP:

1. Provision of subsidy to local small and medium scale entrepreneurs to ease their burden of liquidity deficits and make them more financially viable in pursuing their investment objectives thereby contributing to the advancement of the industry.
2. Consider reducing import duties on inputs, materials, equipment, and accessories being brought in-country in order to encourage wider stakeholders' participation and incentivize them to keep technology viable and sustainable.
3. Take appropriate policy actions to ensure financial and lending institutions provide reduced interest rates or even free-interest loans to firms, entities and entrepreneurs with proven and predictable needs and desire for purchasing implements.
4. Supply and install associated facilities and equipment on farms to shift the burden off local investors or entrepreneurs that may endeavour into the industry.
5. Establish 3 major facilities for value addition of agricultural products (rice, cassava, vegetables, and fruits). The facilities will be built within the agro-ecological zones of Liberia to serve 5 counties each.
6. Revisit existing policies, laws, and strategies to conform them to current realities.
7. Promulgate where appropriate new strategies.
8. The government should ensure existing policies and strategies appertaining to said technologies are implemented.
9. Conduct needs assessment in institutions to identify material gaps.
10. Improve outreach initiatives to women, the elderly and the disadvantaged population.
11. Provide requisite training for women in marketing.
12. Disseminate tariff information and involve women in the negotiation of it.
13. Conduct a labour force survey to ascertain remuneration as appropriate.

Table 8: Actions selected for Value Addition Technology for inclusion in the TAP

Category	Measures	Actions selected for TAP
Economic and Financial	i. Provision of subsidy to local small and medium scale entrepreneurs to ease their burden of liquidity deficits and make them more financially viable in pursuing their investment objectives thereby contributing to the advancement of the industry. ii. Consider reducing import duties on inputs, materials, equipment, and accessories being brought in-country in order to encourage wider stakeholders' participation and incentivize them to keep technology viable and sustainable.	i. Include modalities for financial incentives to local entrepreneurs in the PAPD and LERP ii. Include in the (doing-business protocol) tax exemption or downward adjustment tariff on related materials/equipment. iii. Develop a flexible loan scheme for enterprises. iv. Site identification and land acquisition and procure and deliver facilities to pre-determined sites.
	Take appropriate policy actions to ensure financial and lending institutions provide reduced interest rates or even free-interest loans to firms, entities and entrepreneurs with proven and predictable needs and desire for purchasing implements.	
	Supply and install associated facilities and equipment on farms to shift the burden off local investors or entrepreneurs that may endeavour into the industry.	
	Establish 3 major facilities for value addition of agricultural products (rice, cassava, vegetables, and	

	fruits). The facilities will be built within the agro-ecological zones of Liberia to serve 5 counties each.	
Non-Financial	Revisit existing policies, laws, and strategies to conform them to current realities. Promulgate where appropriate new strategies. The government should ensure existing policies and strategi appertaining to said technologies are implemented. Conduct needs assessment in institutions to identify materia gaps. Improve outreach initiatives to women, the elderly and the disadvantaged population. Provide requisite training for women in marketing. Disseminate tariff information and involve women in the negotiation of same. Conduct a labour force survey to ascertain remuneration as appropriate.	i. Amend, repeal, or develop laws and regulations consistent with the results of the gap analysis. Secure or provide scholarships to train 30 personnel per year working with sector institutions in the technology (consider gender balance). ii. Ensure at least 30% of slots are allocated to women institutions and CBOs involve with the elderly and disadvantaged population. iii. Work with the Liberian Marketing. Association's national and local structures to develop training packages for marketers. iv. Secure or provide scholarships to train 30 personnel per year working with sector institutions in the technology (consider gender balance).

1.1.2.5 Actions to be implemented

This section presents the identified Actions into more specific "Activities." Table 9; shows a list of activities that need to be implemented for achieving the identified action.

Table 9: Activities identified for implementation of Value Addition actions

Actions	Activities
Revised the PAPD and LERP modalities to include financial incentives for local entrepreneurs.	1.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will engage with the departments of economic policy and development planning at the ministry of finance to mainstream financial incentives for local entrepreneurs into the LERP. 1.2 A consultant will be hired by EPA to develop the financial incentive package. 1.3 EPA and the ministry of Agriculture will submit the financial incentive package to MFDP and raise awareness and construct three major value addition facilities.
Initiate policy intervention in the (doing-business protocol) tax exemption or downward adjustment tariff on related materials/equipment around value addition technology.	2.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will engage the National Business Climate Forum to integrate tax adjustment and exemption into its processes. 2.2 A consultant will be hired to elaborate the comprehensive of activities that warrant such dispensation. 2.3 Incorporate this provision into doing- business regulations.
Develop flexible loan schemes for enterprises. Provide 3 major facilities for value addition of agricultural products (rice, cassava, vegetables, and fruits) in the agro-ecological zones of Liberia to serve 5 counties each.	3.1 A consultant will be hired by the Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) to prepare a detailed loan scheme. 3.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will identify financial, lending and borrowing institutions for the potential provision of loans. 3.3 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will set eligibility criteria for accessing the loan. 3.4 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will conduct site identification and land acquisition 3.5 A firm will be hired by The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) to procure and deliver facilities to pre-determined sites.

Amend, repeal, or develop laws and regulations surrounding Agricultural Technologies.	4.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will engage relevant key committee members on the environment and natural resources in the house of parliament to amend, repeal or develop laws surrounding Agricultural Technologies. 4.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will organize series of workshops with policy makers about the importance of amending, repealing, or developing laws that favour the deployment and diffusion of this technology. 4.3 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) engage Civil Society Organisations (CSOs) to increase advocacy to speed up the passing of the laws.
Ensure at least 30% of slots to women institutions and CBOs involve elderly and disadvantaged populations.	5.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to identify and document women institutions and CBOs involved with the elderly and disadvantaged population. 5.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will conduct training for women-led institutions and CBOs to be able to use and maintain the technology. 5.3 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will create a knowledge-sharing platform for women institutions and CBOs involved with the elderly and disadvantaged population.
Work with the Liberian Marketing Association national and local structures to develop training packages for marketers.	6.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to assess at the national and local level the knowledge and capacities of the LMA staff to determine the kind of training packages to be developed. 6.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to develop the training packages for marketers. 6.3 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to roll out the training modules for marketers.
Secure or provide scholarships to train 30 personnel per year working with sector institutions in the technology (consider gender balance).	7.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to identify and document women institutions and CBOs involved with the elderly and disadvantaged population. 7.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to conduct training for women-led institutions and CBOs to be able to use and maintain the technology. 7.3 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will create a knowledge-sharing platform for women institutions and CBOs involved with the elderly and disadvantaged population.

Table 10: Stakeholders and their Role for the Implementation of Value Addition Technology

Key Stakeholders	Role
Environmental Protection Agency	To identify Climate Change funding windows and develop concepts and proposals on behalf of GoL.
Ministry of Agriculture	Take full responsibility for the implementation of the project.
Ministry of Finance Development Planning	Work with the Ministry of Agriculture to leverage GoL in-kind or direct support through budget preparation.
Ministry of Commerce	Enforce product quality checks and conduct training for the technology users.
Ministry of Internal Affairs	Work with the local government structure to ensure the smooth transfer of this technology in rural communities.
National Public Health Institute of Liberia	Enforce the health law to ensure products from this technology are safe for the general public.
Liberia Revenue Authority	Work with the EPA and other relevant institutions to integrate tax adjustment and exemption for this technology.
University of Liberia	Document the knowledge and experiences from the use of this technology and conduct research surround the technology use.
Cuttington University	Work in close consultation with UL to document knowledge and good practices.
Community Colleges	Conduct training for users of this technology.
NGOs/CSOs/CBOs	Help to create education and awareness for this technology.
Liberia Marketing Association	Implement the use of this technology at the local level.
Ministry of Gender, Children and Social Protection	Ensure gender is mainstream in the project implementation.

Table 11: Scheduling and sequencing of specific activities for Value Addition Technology

Action	Activities:	Timeframe (Years)										
		Y 1	Y 2	Y 3	Y 4	Y 5	Y 6	Y 7	Y 8	Y 9	Y 10	Responsible Body
Action 1: Include in the PAPD and LERP modalities for financial incentives to local entrepreneurs.	Activity 1,1 Engagement with the departments of economic policy and development planning at the ministry of finance to mainstream financial incentives for local entrepreneurs into the LERP											MOA, EPA
	Activity 1.2 Develop the financial incentive package.											MOA, EPA
	Activity 1.3 Submit the financial incentive package to MFDP and raise awareness and construct three major value addition facilities											MOA, EPA
Action 2: Include in the (doing-business protocol) tax exemption or downward adjustment tariff on related materials/equipment.	Activity 2.1 Engage the National Business Climate Forum to integrate tax adjustment and exemption into its processes.											MOA, EPA, MFDP
	Activity 2.2 Elaborate on the comprehensive of activities that warrant such dispensation.											MOA, EPA
	Activity 2.3 Incorporate this provision into doing-business regulations.											MOA, MFDP
Action 3: Secure or provide scholarships to train 30 personnel per year working with sector institutions in the technology (consider gender balance).	Activity 3.1 Develop selection criteria or checklist, call for application and final list of qualified candidates.											MOA, MOE
	Activity 3.2 To identify training institutions in the specific area under consideration.											MOE, MOA
	Activity 3.3 Draw up a budget and seek funding from multiple sources.											MOA, EPA
Action 4: Develop flexible loan schemes for enterprises. Provide 3 major facilities for value addition of agricultural products (rice, cassava, vegetables, and fruits) in the agro-ecological zones of Liberia to serve 5 counties each.	Activity 4.1 Prepare a detailed loan scheme.											MOA, EPA
	Activity 4.2 Identify financial, lending and borrowing institutions for the potential provision of loans.											MOA, EPA
	Activity 4.3 Set eligibility criteria for accessing the loan.											MOA, EPA
	Activity 4.4 Site identification and land acquisition											EPA, MOA
	Activity 4.5 Procure and deliver facilities to pre-determined sites.											MOA, EPA

Action 5: Amend, repeal, or develop laws and regulations surrounding Agricultural technology.	Activity 5.1 Engage relevant key committee members on the environment and natural resources in the house of parliament to amend, repeal or develop laws and regulations consistent with the results of the gap analysis.											EPA, MOA
	Activity 5.2 Organize series of workshops with policy makers about the importance of amending, repealing, or developing laws that favour the deployment and diffusion of this technology.											MOA, EPA
	Activity 5.3 Engage CSOs to increase advocacy passing of the laws and regulations for the agricultural technologies.											EPA, MOA
Action 6: Ensure at least 30% of slots to women institutions and CBOs involve elderly and disadvantaged populations.	Activity 6.1 Identify and document women institutions and CBOs involved with the elderly and disadvantaged population.											MOA, UL
	Activity 6.2 Conduct training for women-led institutions and CBOs to be able to use and maintain the technology.											UL, MOA
	Activity 6.3 Create a knowledge-sharing platform for women institutions and CBOs involved with the elderly and disadvantaged population.											EPA, MOA
Work with the Liberian Marketing Association national and local structures to develop training packages for marketers.	Activity 7.1 Assess at the national and local level the knowledge and capacities of the LMA staff to determine the kind of training packages to be developed.											MOA, EPA
	Activity 7.2 Develop the training packages for marketers.											UL, MOA
	7.3 Roll out the training modules for marketers.											MOA, UL

1.1.2.6 Resources Needed for Action and Activities

Capacity for implementation of activities including financial planning skills is required to design the loan/grant credit scheme. Additionally, project management skills are required to implement the activities for the project. Development of concept and project proposal including preparation of contracts and procurement of material and hiring of equipment for the establishment of three (3) major facilities for value addition. The preparation of contracts for consultancy services to conduct various training outlined in the activities plan. Financing: skills are required to identify the funding sources, which the project concept could be aligned, and then coordinate with relevant institutions to secure the funding.

1.1.2.7 Estimation of resources needed for Action and Activities

In order for Liberia to successfully diffuse and deploy Value Addition technology, it will require adequate financial and technical resources to achieve its technology transfer. Below in table 12, are estimated resources needed to deploy the technology.

Table 12: Estimation of resources needed for Value Addition Technology action and activities

No	Activity	Estimated cost (USD)	Source of Funds	Justification
1	Meetings/training workshop	415,000	FAO, UNDP, GIZ, EU	It is expected various meetings including high-level meetings will be held for the possible diffusion and deployment of the technology.
2	Procurement of materials for the construction works of the facilities.	6,000,000	GCF, SIDA, USAID, FAO, GoL	Three value technology facilities will be constructed and equipped and sustained
3	Consultants to conduct various studies and training for different stakeholders identified.	135,000	CTCN, USAID, GEF, FAO, GoL	Several studies will be conducted by different independent firms and individuals for the implementation of the technology.
4	Local and international travel costs for participants including Daily Subsistence allowances.	330,000	CTCN, SIDA, USAID, GCF, GEF, FAO, GoL	During the implementation of the technology, it is expected that there will be regional engagements and as well international travels by the country management team to learn and share Liberia's 5experiences with others.
5	Course materials	45,000	CTCN, USAID, GEF, FAO, GoL	Produce training materials for marketers.
6	Development of awareness materials	65,000	UNDP, FAO, USAID, GoL	Printing of various awareness materials, radio talk shows etc.
7	Procurement of vehicles and motorbikes for the project team	220,000	UNDP, FAO, USAID, Conservation International, GCF, GoL	Four vehicles and 5 Yamaha motorbikes will be procured for the project management team.
	Total	**7,220,000**		

1.1.2.8 Management Planning for Value Addition Technology

Table 13: Risks and Contingency Planning for Value Addition Technology

Risk item	Description	Level of Risk	Mitigation/Contingency Action
Cost	Vehicles and motorbikes procured by this project will have to consider taxes and registration fees which are necessary and may lead to an unexpected increase in the cost.	High	Include contingency line items in the budget to cater to an unexpected increase in the cost.
Legislation or amending new laws	The possibility of legislating or amending new laws to favour this technology could take longer in the house of parliament.	Medium	The EPA and relevant line Ministries will consult with the various committee's heads on the environment to lobby with their colleagues.
Political Interference	The selection process of marketers for the training may face political interference and lead to slowing down the completion of the selection process.	High	The selection process and conditions for selecting the marketers would be made public and transparent.

Table 14: Next Steps for Value Addition Technology

Immediate Requirements:	Appoint within the Climate Change Unit of the EPA, a Coordinator for the Climate Change Agriculture Adaptation technology to follow up on specific issues for the agriculture sector. The coordinator will follow up on the development of ToRs for consultants and training of selected beneficiaries. He/she will be tasked to oversee the implementation of technology.
Critical Steps:	Engagement with the Ministry of Agriculture to take full responsibility for the implementation of the project.

Table 15: TAP Overview Table for Value Addition Technology

Sector	Agriculture							
Sub-sector	Food Sector							
Technology	Value Addition Technology							
Ambition	By 2027, at least 30% of the farming population should have access to and start using this technology.							
Benefits	Reduction in unemployment of farming dependent population by at least 10% and increase Real GDP by 2.3%. Enhancing food production capability of farming households. Increased income for farmers and other beneficiaries along the value chain. Reduction in Agricultural waste.							
Action	Activities to be implemented	Sources of funding	Responsible body and focal point	Time frame (Yr)	Risks	Success criteria	Indicators for Monitoring of implementation	Budget per activity (US$)
Revised the PAPD and LERP modalities to include financial incentives for local entrepreneurs.	1.1 Engagement with the departments of economic policy and development planning at the ministry of finance to mainstream financial incentives for local entrepreneurs into the LERP.	CTCN, EU, World Bank, AfDB, GEF, FAO, and GoL,	EPA, Ministry of Agriculture, MFDP, CDA, and MOC	0-2 yrs.	The delay in the revision of the PAPD and LERP. Inadequate funding will pose a serious risk to the implementation of this action. The reluctance of the government to prioritize such an initiative.	PAPD and LERP were revised, finalized, and approved by the cabinet and the legislature. Incentive packages concluded and widely accepted by beneficiaries.	The number of entrepreneurs benefiting from the incentive packages.	75,000
	1.2 Develop the financial incentive packages.	USAID, FAO, UNDP, GoL, Golden Veroleum, Firestone and Arcelor Mittal	EPA, MOA, MIA, LLA,	1-4 yrs.	In-availability of predictable funding windows to support the development of the financial incentive.	Active coordination taking amongst stakeholders. Wider dissemination and use of research findings from research and training institutions.	Entrepreneurs appreciably financed and thereby technology in operation.	100,000

	1.3 Submit the financial incentive package to MFDP and raise awareness.	GEF, GoL, FAO, AfDB	MOA, EPA, MFDP	2-6	Delay in the disbursement of funds by partners or GoL.	Well demonstrated by a minimum of one donor institution.	15 training conducted per year (one training per county). The percentage of people with knowledge of the value addition technology increased.	10,000
Initiate policy intervention in the (doing-business protocol) tax exemption or downward adjustment tariff on related materials/equipment around value addition technology.	2.1 Engage the National Business Climate Forum to integrate tax adjustment and exemption into its processes.	GoL, CTCN, USAID, SIDA	EPA, MOA, MFDP, MOC	0-1.5	Lack of proper coordination could pose a serious risk. Delay in disbursement of funds by donors or GoL.	Tariff reduction scheme in place.	The number of persons importing materials/equipment around value addition.	25,000
	2.2 Incorporate this provision into doing-business regulations.	GoL, CTCN, USAID, SIDA	EPA, MOA, MFDP, MOC	0-1.5	Lack of proper coordination could pose a serious risk. Delay in disbursement of funds by donors or GoL.	The provision is incorporated into the doing-business regulations.	The implementation of this provision by custom officers.	25,000
Secure or provide scholarships to train 30 personnel per year working with sector institutions in the technology (consider gender balance).	3.1 Develop selection criteria or checklist, call for application and final list of qualified candidates.	FAO, USAID, SIDA, GoL	EPA, MOA, MOE, MFDP, UL	0-1	Lack of proper coordination could pose a serious risk. Delay in disbursement of funds by donors or GoL.	The selection criteria or checklist developed.	The number of applications received using the selection criteria.	15,000
	3.2 To identify training institutions in the specific area under consideration.	GoL, GEF, UNDP, FAO	EPA, MOA, MOE, MFDP	0-1	Difficulty in acquiring funds to implement this activity.	Training institutions identified.	The number of interested institutions.	10,000
	3.3 Draw up a budget and seek funding from multiple sources.	GoL, UNDP, FAO, USAID, GEF	EPA, MOA, MOE, MFDP, UL	0-1.5	Difficulty in acquiring funds to implement this activity. Limited qualified individuals to develop proposals.	Submission of proposals and budget.	The approval of the proposals.	25,000
Develop flexible loan schemes for enterprises. Provide 3 major facilities for value addition of	4.1 Prepare a detailed loan scheme	GoL, UNDP, USAID	EPA, MOA, MFDP, MOC	1-2	Difficulty in acquiring funds to implement this activity.	The loan scheme developed.	The number of enterprises accessing loans.	25,000

agricultural products (rice, cassava, vegetables and fruits) in the agro-ecological zones of Liberia to serve 5 counties each.	4.2 Identify financial, lending and borrowing institutions for the potential provision of loans.	GoL, UNDP	EPA, MOA, MFDP, MOC	1-2	Difficulty in acquiring funds to implement this activity.	Lending and borrowing institutions identified.	Loans provided by the institutions.	15,000
	4.3 Set eligibility criteria for accessing the loan.	GoL, FAO	EPA, MOA, MFDP, MOC, UL	0-1	Difficulty in acquiring funds to implement this activity.	Eligibility criteria in place.	The implementation of the eligibility criteria.	5,000
	4.4 Site identification and land acquisition	CTCN, GCF, FAO, GEF, GoL	EPA, MOA, MFDP, LLA, MOJ	1-3	Difficulty in acquiring funds to implement this activity. Suitability of the site.	Site identified and land purchased.	The available parcel of land and other supporting documents.	90,000
	4.5 Procure and deliver facilities to pre-determined sites.	GCF, SIDA, USAID, FAO, GoL	EPA, MOA, MFDP, LACE	0-5	Difficulty in acquiring funds to implement this activity. Delay in the procurement of materials.	Three value technology facilities are constructed and equipped and sustained.	The running and operation of the facilities.	6,000,000
Amend, repeal or develop laws and regulations for Agricultural Technologies.	5.1 Engage relevant key committee members on the environment and natural resources in the house of parliament to amend, repeal or develop laws and regulations for Agricultural Technologies.	GoL	EPA, MOA, MFDP,	0-1	Difficulty in getting the attention of the committee members.	Committee agreed to develop a Bill for onward submission to the house of parliament.	Bill was introduced to the floor.	20,000
	5.2 Organize a series of workshops with policymakers about the importance of amending, repealing or developing laws that favour the deployment and diffusion of this technology.	GoL	EPA, MOA, MFDP	0-2	Coordination and consensus amongst lawmakers. Political interest and lobbying.	The passage of the bill by the house of parliament.	The implementation and enforcement of the law.	100,000

	5.3 Engage CSOs to increase advocacy for the passage of the bill.	GoL, UNDP	EPA, MOA, FLY, LINSU.	0-1	Difficulty in acquiring funds to implement this activity. Lack of Interest from CSOs.	The passage of the bill.	The implementation and enforcement of the law.	20,000
Ensure at least 30% of slots to women institutions and CBOs involve elderly and disadvantaged populations.	6.1 Identify and document women institutions and CBOs involved with the elderly and disadvantaged population.	UNDP, USAID, SIDA, GoL	EPA, MOA	1-2	Difficulty in acquiring funds to implement this activity.	Women institutions and CBOs identified and documented.	The number of elderly and disadvantaged people attended to.	10,000
	6.2 Conduct training for women-led institutions and CBOs to be able to use and maintain the technology.	FAO, CTCN, UNDP, GoL	EPA, MOA, UL	0-1	Difficulty in acquiring funds to implement this activity.	The availability of training materials. Training conducted	The number of women-led institutions and CBOs trained.	65,000
	6.3 Create a knowledge-sharing platform for women institutions and CBOs involved with the elderly and disadvantaged population.	UNDP, FAO, USAID, GoL	EPA, MOA, MICAT	0-1	Difficulty in acquiring funds to implement this activity. Hosting and maintenance of the website	The available knowledge-sharing platform.	The number of information shared on the platform.	25,000
Work with the Liberian Marketing Association national and local structures to develop training packages for marketers.	7.1 Assess at the national and local level the knowledge and capacities of the LMA staff to determine the kind of training packages to be developed.	CTCN, USAID, GEF, FAO, GoL	EPA, MOA, UL	1-3	Difficulty in acquiring funds to implement this activity.	Availability of the assessment report	The number of markets and counties assessed.	110,000
	7.2 Develop training packages for marketers.	CTCN, USAID, GEF, FAO, GoL	EPA, MOA, MOE, MFDP	0-1	Difficulty in acquiring funds to implement this activity.	Training packages available.	The categorization of the training packages.	45,000
	7.3 Roll out the training modules for marketers.	CTCN, USAID, GEF, FAO, GoL	EPA, MOA, MOE, MFDP, UL	0-1	Difficulty in acquiring funds to implement this activity.	The number of marketers trained.	The number of training conducted.	230,000
	Total							**8,349,000**

1.1.3 Action Plan for Technology 2: Improved Storage Technology

1.1.3.1 Introduction

During the first round of the Liberia TNA process, the adaptation Sectorial Working Group (ASWG) contributed their technical expertise and input into technology prioritization, which leads to the selection of Improved Storage as a priority technology for the agriculture of Liberia. This technology was ranked second after Value addition technology. This technology was selected at the time when Liberia is faced with a lot of post-harvest losses ranging from different agricultural products to fish harvested or fished to be sold on the market. Knowing the kind of benefits that this technology brings, the stakeholders believe that the technology will bring about mitigating losses in crops during the peak of harvest especially during the rainy season when there are lots of greens, fresh tomatoes, peppers, vegetables etc. in surplus but soon disappear due to lack of storage. Most of the agriculture end up spoiling. Additionally, the stakeholders thought that the technology guarantees the availability and low cost of food crops in all seasons, and it brings relief to farmers and sellers of crops.
This technology once implemented will create more jobs for Liberians and will put money in the pockets of poor farmers and agriculture business people.

1.1.3.2 Ambition for the TAP

Improved storage technology is a very important tool that guarantees the constant availability and low cost of food crops all year round for both the farmers producing and consumers. The goal and objective of deploying and diffusing this technology are to meet consumers' needs all year round and lower the cost of food crops throughout Liberia. To achieve this, it will require the support and involvement of institutions and individuals such as the Liberian Land Authority, policymakers, county Superintendents, the ministry of Agriculture, regional agriculture coordinators and extension officers.
The participation and involvement of the University of Liberia are keen and as well as other higher learning institutions across the country. Other interest groups include Agricultural NGOs, the Civil Society Organizations all of whom will play roles in achieving the transfer, diffusion, and sustainability of this technology throughout the country. Gender mainstreaming should be at the core of the implementation of this technology.

1.1.3.3 Actions and Activities Selected for Inclusion in the TAP for Improved Storage Technology

Summary of barriers and measures to overcome barriers

Like value addition technology, the actions, and activities for inclusion into the TAP were selected from the measures identified to overcome the barriers to the diffusion of this technology. The barriers were identified through stakeholder's consultations and expert inputs using logical problem analysis and market mapping. The actions and activities were prioritized for inclusion in the TAP. *See below table 1*

Table 16: Summary of barrier and measure for Improved Storage Technology

Improved Storage		
Categories	**Identified Barriers**	**Measures**
Economic and financial barriers	Low or no budgetary allocation for research into the technology.	Governments need to allocate or dedicate funding for the development of the Technology.
	High cost of constructing physical infrastructure and storage facilities.	Ensure reduce taxes on research instruments, and other necessary materials used for the development of the technology.
	Lack of economic and financial incentives for community ownership and participation	Foster public-private partnership in research and development of the technology
	Widespread post-harvest loss adversely impacting food availability.	Introduction of Improved Storage (drying & freezing) – is to build 3 storage facilities for seeds, grains, and vegetables in 3 agro-ecological zones of Liberia.
Non-financial barriers:		

Policy, legal and Institutional:	Lack of appropriate policy, legal and regulatory framework.	Strengthen institutional capacity of agriculture research.
	Inadequate technical expertise.	Agricultural extension services may be geared to disseminate appropriate knowledge and awareness about the availability and potential benefits of the technology.
	Insufficient data sharing and collaboration among relevant institutions	Develop occupational health and safety measures that are women sensitive.
Gender and other social-cultural issues:		
	Lack of women-specific considerations in occupational health and safety. Check gender-based disadvantages and abuse in the work setting.	Incorporate safeguards that disallowed gender-based offences and abuse in the work setting.
	Disfavour of persons with disabilities and other disadvantaged youths and the elderly.	Provision of incentives to encourage persons with disabilities and other disadvantaged youths and the elderly to fully participate.

1.1.3.4 Actions selected for inclusion in the TAP

As per the Improved Storage Technology, actions selected for inclusion in the TAP are based on the measures specified in Table 17 that were derived from Liberia's second TNA report on barrier analysis. This section provides a comprehensive list of the measures selected as actions to be included in the TAP:

1. Governments need to allocate or dedicate funding for the development of Technology.
2. Ensure reduce taxes on research instruments, and other necessary materials used for the development of the technology.
3. Foster public-private partnership in research and development of the technology
4. Introduction of Improved Storage (drying & freezing) – is to build 3 storage facilities for seeds, grains, and vegetables in 3 agro-ecological zones of Liberia.
5. Strengthen institutional capacity of agriculture research.
6. Agricultural extension services may be geared to disseminate appropriate knowledge and awareness about the availability and potential benefits of the technology.
7. Develop occupational health and safety measures that are women sensitive.
8. Incorporate safeguards that disallowed gender-based offences and abuse in the work setting.
9. Provision of incentives to encourage persons with disabilities and other disadvantaged youths and the elderly to fully participate.

Table 17: Activities identified for implementation of Improved Storage actions

Actions	Activities
Adequate budgetary allocation for the development of the Technology.	1.1 The Ministry of Finance and Development Planning (MFDP) and the Ministry of Agriculture (MOA) will prioritize the subsector in national budgeting and planning processes. 1.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will explore additional local sources of funding within the private sector.
Ensure reduce taxes on research instruments, and other necessary materials used for the development of the technology.	2.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will make the case either at the doing-business forum or the national budget process for a tax incentive in the procurement of materials and instruments used in the implementation of the technology.
Foster public-private partnership in research and development of the technology.	3.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will identify appropriate private entities with capacity and specific programs related to the technology.

	3.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) draw up an MOU specifying the duties and responsibilities of parties involved in the partnership.
Provide strategic facilities for improved storage.	4.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will introduce and popularize the Improved Storage technology. 4.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a firm to procure and deliver (drying & freezing) equipment particularly for storage of seeds, grains, and vegetables in 3 agro-ecological zones of Liberia.
Strengthen institutional capacity of agriculture research.	5.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to conduct a needs assessment of capacity gaps at the institutional level in agriculture research. 5.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will address the identified gaps from the needs assessment and capacitate institutions working in agriculture research.
Mainstream principles and practice of improved storage technology in existing agriculture programs.	6.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to develop modules covering specific areas in improved storage technology. 6.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will identify and recruit resource persons in the training of the modules.
Develop occupational health and safety measures that are women sensitive.	7.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to develop an occupational health and safety measures module favourable for women. 7.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to roll out the module and create a nationwide education and awareness about women issues in the working environment
Incorporate safeguards that disallowed gender-based offences and abuse in the work setting.	8.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will work with the ministry of gender to incorporate safeguards in the handbook of institutions and companies that disallowed gender-based offences and abuse in the work setting.
Provision of incentives to encourage persons with disabilities and other disadvantaged youths and the elderly to fully participate.	9.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a firm to procure and make available specialised tools that can be used by persons with disabilities and other disadvantaged youths and the elderly to fully participate.

1.1.3.5 Actions to be implemented as Project Ideas for Improved Storage Technology

For this Improved Storage technology, 9 actions have been identified to implement this technology in Liberia. *See table 18 below*.

Table 18: Stakeholders and their Role for the Implementation of Improved Storage Technology

Key Stakeholders	Role
Environmental Protection Agency	To identify Climate Change funding windows and develop concepts and proposals on behalf of GoL.
Ministry of Agriculture	Take full responsibility for the implementation of the project.
Ministry of Finance Development Planning	Work with the Ministry of Agriculture to leverage GoL in-kind or direct support through budget preparation.
Ministry of Commerce	Enforce product quality checks and conduct training for the technology users.
Ministry of Internal Affairs	Work with the local government structure to ensure the smooth transfer of this technology in rural communities.
National Public Health Institute of Liberia	Enforce the health law to ensure products from this technology are safe for the general public.
Liberia Revenue Authority	Work with the EPA and other relevant institutions to integrate tax adjustment and exemption for this technology.

University of Liberia	Document the knowledge and experiences from the use of this technology and conduct research surround the technology use.
Cuttington University	Work in close consultation with UL to document knowledge and good practices.
Community Colleges	Conduct training for users of this technology.
NGOs/CSOs/CBOs	Help to create education and awareness for this technology.
Liberia Marketing Association	The marketers are the direct beneficiaries of the technology, they will ensure the use of it at the local level.
Ministry of Gender, Children and Social Protection	Ensure gender is mainstream in the project implementation.

Table 19: Scheduling and sequencing of specific activities for Improved Storage Technology

Action	Activities:	Timeframe (Years)										
		Y 1	Y 2	Y 3	Y 4	Y 5	Y 6	Y 7	Y 8	Y 9	Y 10	onsible Body
Action 1: Adequate budgetary allocation for the development of the Technology.	Activity 1.1 Prioritize the subsector in national budgeting and planning processes.											MOA, MFDP
	Activity 1.2 Explore additional local sources of funding within the private sector											MOA, EPA
Action 2: Ensure reduce taxes on research instruments, and other necessary materials used for the development of the technology.	Activity 2.1 Make the case either at the doing-business forum or the national budget process for a tax incentive in the procurement of materials and instruments used in the implementation of the technology.											EPA, MFDP, MOA
Action 3: Foster public-private partnership in research and development of the technology.	Activity 3.1 Identify appropriate private entities with capacity and specific programs related to the technology.											MOA, EPA
	Activity 3.2 Draw-up an MOU specifying the duties and responsibilities of parties involved in the partnership.											MOA, EPA
Action 4: Provide strategic facilities for improved storage.	Activity 4.1 Introduction and popularization of Improved Storage technology.											MOA, EPA
	Activity 4.2 Procure and deliver (drying & freezing) equipment particularly for storage of seeds, grains and vegetables in 3 agro-ecological zones of Liberia.											MOA,EPA
Action 5: Strengthen institutional capacity of agriculture research.	Activity 5.1 Conduct needs assessment of capacity gaps at the institutional level in agriculture research.											MOA, UL
	Activity 5.2 Address the identified gaps from the needs assessment and capacitate institutions working in agriculture research.											MOA, EPA
Action 6: Mainstream principles and practice of improved storage	Activity 6.1 Develop modules covering specific areas in improved storage technology.											MOA, UL

technology in existing agriculture programs.	Activity 6.2 Identify and recruit resource persons in the training of the modules.											MOA, EPA
Action 7: Develop occupational health and safety measures that are women sensitive.	Activity 7.1 Hire a consultant to develop an occupational health and safety measures module favourable for women.											MOA, EPA
	Activity 7.2 Roll out the module and create a nationwide education and awareness about women issues in the working environment											MOA, EPA
Action 8: Incorporate safeguards that disallowed gender-based offences and abuse in the work setting.	Activity 8.1 Work with the ministry of gender to incorporate safeguards in the handbook of institutions and companies that disallowed gender-based offences and abuse in the work setting.											EPA, MOA, MGCSP
Action 9: Provision of incentives to encourage persons with disabilities and other disadvantaged youths and the elderly to fully participate.	Activity 9.1 Identify and list beneficiaries to benefit from the incentive package.											MOA, MGCSP
	Activity 9.2 Procure and made available specialised tools that can be used by persons with disabilities and other disadvantaged youths and the elderly to fully participate.											MOA, MGCSP
	Activity 9.3 Distribute tools to the beneficiaries.											MOA, MGCSP, EPA

1.1.3.6 Resources Needed for Action and Activities for Improved Storage Technology

The materials and skills required to conduct different assessments and capacity needs for the successful deployment and diffusion of the technology. Acquiring financial and technical supports will depend on the development of concept notes and project proposals including preparation of contracts and procurement of material and hiring of equipment for the construction of three (3) major facilities for Improved Storage Technology. The preparation of contracts for consultancy services to conduct various training outlined in the activities plan. Financing: skills are required to identify the funding sources, which the project concept could be aligned, and then coordinate with relevant institutions to secure the funding.

1.1.3.7 Estimated costs for implementing activities

It is expected that different activities will be carried out in order to diffuse and deploy the improved storage technology. The resources needed for the action and activities are outlined in table 20 below.

Table 20: Estimation of resources needed for Improved Storage action and activities

No	Activity	Estimated cost (USD)	Source of Funds	Justification
1	Meetings/training workshops	189,500	GIZ, CTCN, AfDB, UNDP, WB, GoL	There will be series of high-level meetings and training workshops held for the possible diffusion and deployment of the technology.
2	Procurement of materials for the construction works of the facilities.	2,650,000	GCF, EU, GIZ, AfDB, WB,	Three value technology facilities will be constructed and equipped and sustained
3	Consultants to conduct various studies and training for different stakeholders identified.	34,500	FAO, UNDP, GoL	During the implementation of the activities, different consultants will be hired to perform various tasks.
4	Local travel costs for participants including Daily Subsistence allowances.	85,000	FAO, UNDP, GIZ, EU	Payment of transportation reimbursement for participants from far away counties to a workshop or meeting venue.
5	Development of awareness materials	75,000	UNDP, FAO, USAID, GoL	Printing of various awareness materials, radio talk shows etc.
	Total	**3,034,000**		

1.1.3.8 Management Planning for Improved Storage Technology

Table 21: Risks and Contingency Planning for Improved Storage Technology

Risk item	Description	Level of Risk	Mitigation/Contingency Action
Proposal development	Finding appropriate funding windows to support the implementation of the activities could delay due to donor requirements and opening for the call for proposals.	Low	The EPA will make available a funding directory that the technology focal Point will use to source funding.
Scheduling	There could be a delay on the part of the Ministry of Agriculture to make follow up on the next step which could affect the timeframe estimated to start planning or implementing the activities.	Medium	A focal point for the technology implementation will be appointed soonest to begin engaging the ministry of agriculture on the next steps.
Cost	Transporting materials from Monrovia to the rural part will cause an additional burden on the implementation of the activities.	High	Include contingency line items in the budget to cater to the unexpected increase in the cost.

Table 22: Next Steps for Improved Storage Technology

Immediate Requirements:	Appoint within the Climate Change Unit of the EPA, a Coordinator for the Climate Change Agriculture Adaptation technology to follow up on specific issues for the agriculture sector. The coordinator will follow up on the development of ToRs for consultants and training of selected beneficiaries. He/she will be tasked to oversee the implementation of technology.
Critical Steps:	The EPA should compile a list of climate-smart technology funding directories to enable the technology focal point and the Ministry of Agriculture to begin early planning and proposal development.

Table 23: Overview Table for Improved Storage Technology

Sector	Agriculture							
Sub-sector	Food Sector							
Technology	Improved Storage Technology							
Ambition	Functional storage facilities constructed in Lofa, Bong, Nimba, Grand Kru, Maryland, Sinoe and Upper Montserrado by 2027							
Benefits	- Impact most vulnerable people and communities - Reduce spoilage of food and prolong its availability - Compliment income generating for households - Reduce the incidence of contaminating food consumption							
Action	Activities to be implemented	Sources of funding	Responsible body and focal point	Time frame (Yr)	Risks	Success criteria	Indicators for Monitoring of implementation	Budget per activity (US$)
Adequate budgetary allocation for the development of the Technology.	1.1 Prioritize the subsector in national budgeting and planning processes.	GoL	EPA, MOA, MFDP	0-1	Low political will on the part of GoL to prioritize the subsector.	Subsector adequately captured in the national planning process.	The sector is functioning consistently with the TAP objective.	5,000
	1.2 Explore additional local sources of funding within the private sector.	UNDP, FAO, GoL	EPA, MOA, MFDP	0-1	Bottlenecks and or delay in securing funds.	The will of the private sector is fully invited.	At least three private-sector institutions are committed to providing predictable funding.	10,000
Ensure reduce taxes on research instruments, and other necessary materials used for the development of the technology.	2.1 Make the case either at the doing-business forum or the national budget process for a tax incentive in the procurement of materials and instruments used in the implementation of the technology.	GoL	EPA, MOA, MFDP	0-1	The inadequate political will to support the initiative. Reluctance on the part of decision-makers to buy into the technology.	Contact established with Business Climate Forum and opportunity provided to make the case for a tax incentive.	10-15% reduction in tax associated with the importation of materials and equipment used in the technology.	5,000
Foster public-private partnership in research and	3.1 Identify appropriate private entities with capacity and specific	GoL	EPA, MOA, MFDP	0-1	Lack of interest from the private sector.	Several private entities are documented to	At least three private entities signed onto participating in the	5,000

development of the technology.	programs related to the technology.					having capacity in the technology.	implementation of the technology.	
	3.2 Draw-up an MOU specifying the duties and responsibilities of parties involved in the partnership.	GoL	MOA, EPA, MFDP, NIC	0-1	Impediments with wider acceptability of parties with terms and conditions of MOU.	MOU drew up and produced.	Four private institutions signed onto the MOU.	5,000
Provide strategic facilities for improved storage.	4.1 Introduction and popularization of Improved Storage technology.	USAID, FAO, UNDP, GoL	EPA, MOA, MFDP	1-2	Inadequate public education and awareness.	Popularization plan and strategy of the technology drawn up.	Up to 80% of the farming population have access to and using the technology.	10,000
	4.2 Procure and deliver (drying & freezing) equipment particularly for storage of seeds, grains, and vegetables in 3 agro-ecological zones of Liberia.	GCF, EU, GIZ, AfDB, WB, USAID, GoL	EPA, MOA, MFDP, UNDP, FAO	1-4	Difficulty in selecting and securing final hosting sites. Delay in securing funds.	Materials are procured.	3 facilities (drying & freezing) materials delivered to beneficiaries and in use.	2,250,000
Strengthen institutional capacity of agriculture research.	5.1 Conduct needs assessment of capacity gaps at the institutional level in agriculture research.	GoL	EPA, MOA, MFDP	0-1	Inadequate political and weak momentum.	Report of needs assessment available.	Institutional capacity needs and gaps identified.	5,000
	5.2 Address the identified gaps from the needs assessment and capacitate institutions working in agriculture research.	GoL, GIZ, UNDP, GEF, FAO, AfDB	EPA, MOA, MFDP, UNDP, GIZ	1-2	Delay in securing funding.	Gaps are identified.	75% of the institution working in agriculture research are capacitated to support the implementation of the technology.	40,000
Mainstream principles and practice of improved storage technology in	6.1 Develop modules covering specific areas in improved storage technology.	FAO, UNDP, GoL	EPA, MOA, MFDP, UNDP	0-2	Limited human resource capacity.	Modules on Improved Storage developed.	85% of the beneficiaries are acquired skills in the implementation of the technology.	25,000

existing agriculture programs.	6.2 Identify and recruit resource persons in the training of the modules.	GoL	EPA, MOA, MFDP	0-1	Limited human resource capacity.	The resource was identified and placed into a compendium of experts.	25 resource persons prepared to conduct training.	4,500
Develop occupational health and safety measures that are women sensitive.	7.1 Hire a consultant to develop an occupational health and safety measures module favourable for women.	GoL	EPA, MOA, MFDP	0-1	Limited human resource capacity.	Consultant hired.	Occupational health and safety modules screwed to women specificities developed.	4,500
	7.2 Roll out the module and create a nationwide education and awareness about women issues in the working environment	GIZ, AfDB, UNDP, WB, GoL	EPA, MOA, MFDP, UNDP, FAO, WB, GIZ	1-4	Delay in securing funding.	Module sensitivity to women issues in the working environment developed.	400 women across all agro-ecological zones engaged.	75,000
Incorporate safeguards that disallowed gender-based offences and abuse in the work setting.	8.1 Work with the ministry of gender to incorporate safeguards in the handbook of institutions and companies that disallowed gender-based offences and abuse in the work setting.	GIZ, AfDB, UNDP, WB,GoL	EPA, MOA, MFDP, UNDP, FAO, WB, GIZ	1-2	Delay in securing funding.	Contact with Gender Ministry established to incorporate safeguard on gender-based offences and abuse in the handbook of institutions and companies.	80% of targeted institutions incorporate safeguards on gender-based offences and abuse in the handbook of institutions and companies.	50,000
Provision of incentives to encourage persons with disabilities and other disadvantaged youths and the elderly to fully participate.	9.1 Identify and list beneficiaries to benefit from the incentive package.	GoL	EPA, MOA, MFDP	0-1	Partial identification of beneficiaries.	List of beneficiaries developed and documented.	85% of identified beneficiaries have access to incentive package.	4,500
	9.2 Procure and made available specialised tools that can be used by persons with disabilities and other disadvantaged	GIZ, CTCN, USAID, AfDB, UNDP, WB,GoL	EPA, MOA, MFDP, UNDP, FAO, WB, GIZ	2-4	Delay in securing funding.	Tools that can be used by persons with disabilities and other disadvantaged youths and the	Tools that can be used by persons with disabilities and other disadvantaged youths and the elderly are ready to be distributed.	400,000

	youths and the elderly to fully participate.					elderly are procured and available.		
	9.3 Distribute tools to the beneficiaries.	GIZ, AfDB, UNDP, WB, CTCN, USAID, GoL	EPA, MOA, MFDP, UNDP, FAO, WB, GIZ	3-4	Delay in procurement or availability of tools.	Plan to distribute tools that can be used by persons with disabilities and other disadvantaged youths and the elderly developed.	Tools that can be used by persons with disabilities and other disadvantaged youths and the elderly are distributed and in use.	100,000
	Grand Total							**2,998,500**

1.1.4 Action Plan for Technology 3: Integrated Soil Fertility Management Technology

1.1.4.1 Introduction

During the technology prioritization workshop, the participants proposed this technology, and they prioritize it as the third-ranked technology. This technology has both mitigation and adaptation benefits. This technology helps to reduce the cutting down of forested areas thereby allowing for carbon to be stocked. Additionally, it improves farmer's income levels and brings about economic stability. It as well guarantees the availability of food crops and helps farmers save more money.

This technology will be introduced in 4 of the agro-ecological zones of Liberia. The EPA in collaboration with the Ministry of Agriculture will work for hand – in – hand to deploy this technology and encourage the wide use of it by farmers.

1.1.4.2 Ambition for the TAP

The goal and objective of deploying and diffusing this technology are to reduce shifting cultivation and provide a better opportunity for farmers to produce crops more sustainably. To achieve this, it will require the support and involvement of local traditional leaders through the Ministry of Internal Affairs, Ministry of Agriculture, and the Environmental protection Agency of Liberia.

Other institutions and groups that are important to influence the wide use of this technology are the NGOs, the Civil Society Organizations of Liberia, and the University of Liberia, all of whom will play key roles in achieving the transfer, diffusion, and sustainability of this technology throughout the country. Gender mainstreaming should be at the core of the implementation of this technology.

1.1.4.3 Actions and Activities Selected for Inclusion in the TAP for ISFM Technology

Summary of barriers and measures to overcome barriers

The actions and activities for inclusion were selected from the measures identified to overcome the barriers to the diffusion of this technology. The barriers were identified through stakeholder's consultations and expert inputs using logical problem analysis and market mapping. The actions and activities were prioritized for inclusion in the TAP. *See below table 24.*

Table 24: Summary of barrier and measure for ISFM Technology

Integrated Soil Fertility Management		
Categories	**Identified Barriers**	**Measures**
Economic and financial barriers	Lack of budgetary allocation at national and sectoral levels for the development of the Technology.	Prioritize adequate budgetary allocation at sector-specific and national levels for the development and management of the technology.
	Lack of economic incentives to attract private sector involvement or participation.	Provide economic incentives to the attractive private sector and community participation
	Lack of organized and functioning Integrated Soil Fertility Management program.	Provide and keep functional 4 Integrated Soil Fertility Management facilities in four agro-ecological zones of Liberia.
Non-financial barriers:		
Policy, legal and Institutional:	Inadequate policy, legal and regulatory framework expedient for research and development of the technology.	Develop appropriate policy, legal and regulatory prescriptions for the development of the Technology.
	Weak capacity of training and research institutions to research the Technology.	Provide and or increase financial support to relevant institutions for enhancing their capacity to manage the development of the technology;
	The complexity of land use and land tenure across the country.	The intervention of land tenure should consider existing tribal or other related community issues to land acquisition.

	Inadequate awareness and information on the benefits of technology.	Carry out effective education and awareness on the benefits of the technology.
Gender and other social-cultural issues	Competitive ownership of land amongst community members.	The land acquisition should consider the complexity of land tenure to avoid disadvantages in women, persons with disabilities, IDPs and the elderly.
	Problems with ignoring existing land tenure regime.	All interventions should consider the existing land tenure regime in the locality.
	Lack of traditional knowledge in enhancing soil fertility.	Consider traditional knowledge to enhance soil fertility.

1.1.4.4 Actions selected for inclusion into TAP

Table 25: Activities identified for implementation of ISFM actions

Actions	Activities
Prioritize adequate budgetary allocation at sector-specific and national levels for the development and management of the technology.	1.1 The Ministry of Finance and Development Planning (MFPD) and the Ministry of Agriculture will make an adequate budgetary allocation in support of the development and implementation of the technology. 1.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will consider additional funding locally besides national budgetary processes.
Provide economic incentives to the attractive private sector and community participation.	2.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will encourage public-private partnerships for the implementation of the technology.
Provide and keep functional 4 Integrated Soil Fertility Management facilities in four agro-ecological zones of Liberia.	3.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will identify the sites and acquisition of land suitable to host the facilities. 3.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to procure and install the Integrated Soil Fertility equipment in the 4 agro-ecological zones of Liberia.
Develop appropriate policy, legal and regulatory prescriptions for the development of the Technology.	4.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to identify policy gaps impeding the development and transfer of the technology. 4.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will work with the National Legislatures to revised and or promulgate policy and laws to facilitate the development and improvement of the technology.
Provide and or increase financial support to relevant institutions for enhancing their capacity to manage the development of the technology.	5.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will conduct a capacity needs assessment of institutions identified to be implementing the technology. 5.2 The Ministry of Finance and Development Planning in collaboration with the Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will provide soft loans as an incentive to keep the technology in operation.
Carry out effective education and awareness on the benefits of the technology.	6.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to develop educational and awareness modules in the use of the technology. 6.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will seek donor supports to provide technical and financial support for training in the use of the technology.
Consider traditional knowledge to enhance soil fertility.	7.1 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will hire a consultant to conduct the survey, assess and document available and known traditional knowledge in soil fertility management. 7.2 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will develop protocols for the safe integration of identified traditional knowledge into existing scientific pools. 7.3 The Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA) will popularize the identified traditional knowledge for wider use.

1.1.4.5 Actions to be implemented

Seven (7) actions have been identified to implement this technology in Liberia. The actions will be used to source funding for the smooth deployment and diffusion of this technology:

1. Prioritize adequate budgetary allocation at sector-specific and national levels for the development and management of the technology.
2. Provide economic incentives to the attractive private sector and community participation.
3. Provide and keep functional 4 Integrated Soil Fertility Management facilities in four agro-ecological zones of Liberia.
4. Develop appropriate policy, legal and regulatory prescriptions for the development of the Technology.
5. Provide and or increase financial support to relevant institutions for enhancing their capacity to manage the development of the technology.
6. Carry out effective education and awareness on the benefits of the technology.
7. Consider traditional knowledge to enhance soil fertility.

Table 26: Stakeholders and their Role for the Implementation of ISFM Technology

Key Stakeholders	Role
Environmental Protection Agency	To identify Climate Change funding windows and develop concepts and proposals on behalf of GoL.
Ministry of Agriculture	Take full responsibility for the implementation of the project.
Ministry of Finance Development Planning	Work with the Ministry of Agriculture to leverage GoL in-kind or direct support through budget preparation.
Ministry of Commerce	Enforce product quality checks and conduct training for the technology users.
Ministry of Internal Affairs	Work with the local government structure to ensure the smooth transfer of this technology in rural communities.
Liberia Land Authority	Work with the EPA and the Ministry of Agriculture to identify land across the 4 agro-ecological zones for the construction of the facilities.
University of Liberia	Document the traditional knowledge and experiences from the use of this technology.
Cuttington University	Work in close consultation with UL to document the traditional knowledge and good practices.
NGOs/CSOs/CBOs	Help to create education and awareness for this technology.
Ministry of Gender, Children and Social Protection	Ensure gender is mainstream in the project implementation.

Table 27: Scheduling and sequencing of specific activities

Action	Activities:	Timeframe (Years)										
		Y 1	Y 2	Y 3	Y 4	Y 5	Y 6	Y 7	Y 8	Y 9	Y 10	Responsible Body
Action 1: Prioritize adequate budgetary allocation at sector-specific and national levels for the development and management of the technology.	Activity 1.1 Make adequate budgetary allocation in support of the development and implementation of the technology.											MOA, MFDP
	Activity 1.2 Consider additional funding locally besides national budgetary processes.											MOA, EPA
Action 2: Provide economic incentives to the attractive private sector and community participation.	Activity 2.1 Encourage public-private partnership for the implementation of the technology.											MOA, EPA
Action 3: Provide and keep functional 4 Integrated Soil Fertility Management facilities in four agro-ecological zones of Liberia.	Activity 3.1 Identify the sites and acquisition of land suitable to host the facilities.											MOA, LLA,EPA
	Activity 3.2 Procure and install the Integrated Soil Fertility equipment in the 4 agro-ecological zones of Liberia.											MOA, EPA
Action 4: Develop appropriate policy, legal and regulatory prescriptions for the development of the Technology.	Activity 4.1 Identify policy gaps impeding the development and transfer of the technology.											MOA, EPA
	Activity 4.2 Revised and or promulgate policy and laws to facilitate the development and improvement of the technology.											MOA, EPA
Action 5: Provide and or increase financial support to relevant institutions for enhancing their capacity to manage the development of the technology.	Activity 5.1 Conduct capacity needs assessment of institutions identified to be implementing the technology.											MOA, EPA
	Activity 5.2 Provide soft loans as an incentive to keep the technology in operation.											MOA, EPA
Action 6: Carry out effective education and awareness on the benefits of the technology.	Activity 6.1 Develop educational and awareness modules in the use of the technology.											MOA, EPA
	Activity 6.2 Provide technical and financial support for training in the use of the technology.											MOA,EPA

Action 7: Consider traditional knowledge to enhance soil fertility.	Activity 7.1 Survey, assess and document available and known traditional knowledge in soil fertility management.											MOA, UL
	Activity 7.2 Develop protocols for the safe integration of identified traditional knowledge into existing scientific pools.											MOA, UL, EPA
	Activity 7.3 Popularize the identified traditional knowledge for wider use.											MOA, EPA

1.1.4.6 Resources Needed for Action and Activities for ISFM

In order to successfully deploy and diffuse this technology, it will require gathering both financial and technical supports and early development of concept notes and project proposals including preparation of contracts and procurement of material and hiring of equipment for the construction of four (4) major facilities for ISFM Technology.

1.1.4.7 Estimated costs for implementing activities

It is expected that different activities will be carried out in order to diffuse and deploy the integrated soil fertility management technology. The resources needed for the action and activities are outlined in table 28 below.

Table 28: Estimation of resources needed for ISFM Technology action and activities

No	Activity	Estimated cost (USD)	Source of Funds	Justification
1	Meetings/training workshops	283,500	GIZ, AfDB, WB, EU, UNDP, USAID, GoL	There will be series of high-level meetings and training workshops held for the possible diffusion and deployment of the technology.
2	Procurement of materials for the construction works of the facilities.	2,800,000	GIZ, GCF, AfDB, WB, EU, UNDP, USAID, GoL	Procurement of materials including payment of services of the firm to construct 4 integrated soil fertility facilities.
3	Consultants to conduct various studies and training for different stakeholders identified.	139,500	GIZ, AfDB, WB, EU, UNDP, USAID, GoL	Several studies will be conducted by different independent firms and individuals for the implementation of the technology.
4	Loans for project beneficiaries	500,000	GIZ, AfDB, WB, EU, UNDP, USAID, GoL	Provide soft loans as an incentive to keep the technology in operation.
5	Development of awareness materials	55,000	UNDP, USAID, FAO	Printing of various awareness materials, radio talk shows etc.
	Total	**3,777,500**		

1.1.4.8 Management Planning for ISFM

Table 29: Risks and Contingency Planning for ISFM

Risk item	Description	Level of Risk	Mitigation/Contingency Action
Cost	It will require extra cost to maintain the established demonstration sites.	Low	Include contingency line items in the budget to cater to an unexpected increase in the cost.
Acceptability	It will be difficult for people to leave traditional farm practices to adopt the new technology.	High	Series of educational workshops and awareness will be conducted and raised to explain the new technology.
Scheduling	Again, it will take some time for MOA or EPA to begin following up on the planned activities.	Medium	The technology focal will be in place to make follow-ups with the MEAs Coordinator and the Ministry of Agriculture.

Table 30: Next Steps for ISFM

Immediate Requirements:	Appoint within the Climate Change Unit of the EPA, a Coordinator for the Climate Change Agriculture Adaptation technology to follow on specific issues for the agriculture sector. The coordinator will follow up on the development of ToRs for consultants and training of selected beneficiaries. He/she will be tasked to oversee the implementation of technology.
Critical Steps:	Early engagements with community leaders to identify land areas for the deployment of the technology.

Table 31: Overview Table for Integrated Soil Fertility Management Technology

Sector	Agriculture							
Sub-sector								
Technology	INTEGRATED SOIL FERTILITY MANAGEMENT							
Ambition	4 Integrated Soil Fertility Management facilities are in place to help Liberia meets its overall climate actions by reducing deforestation and improving farming practices for all 15 counties by 2025.							
Benefits	- Guarantees the availability of food crops for rural people. - Improve farmer's income level and bring about economic stability. - It helps to reduce the cutting down of forested areas thereby allowing for biodiversity Conservation.							
Action	Activities to be implemented	Sources of funding	Responsible body and focal point	Time frame (year)	Risks	Success criteria	Indicators for Monitoring of implementation	Budget per activity (US$)
Prioritize adequate budgetary allocation at sector-specific and national levels for the development and management of the technology.	1.1 Make adequate budgetary allocation in support of the development and implementation of the technology.	GoL	EPA, MOA, MFDP	0-1	Low recognition of the sector agencies during national planning and budgeting processes. Frequent relegation of the sector during prioritization.	The sector is recognized and actively participating in the national budgeting and planning processes. The sector is brought to centre stage at the national level.	The allocation was made for the deployment of 4 facilities to host the ISFM technology. The facilities are visible and accounted for.	5,000

	1.2 Consider additional funding sources locally besides national budgetary processes.	GoL	EPA, MOA, MFDP	1-2	Reluctance on the part of national-level stakeholders and institutions.	Potential national funding sources were identified and catalogued.	At least three national funding institutions expressed interest and providing predictable funding.	4,500
Provide economic incentives to the attractive private sector and community participation.	2.1 Encourage public-private partnership for the implementation of the technology.	GoL	EPA, MOA, MFDP	0-1	Failure to adequately invite the will of key private sector players to a national dialogue for PPP meeting.	Ongoing PPP discussions at the national level.	MOU drafted, disseminated and widely accepted. At least 5 private sector institutions signed onto the MOU.	15,000
Provide and keep functional 4 Integrated Soil Fertility Management facilities in four agro-ecological zones of Liberia.	3.1 Identify the sites and acquisition of land suitable to host the facilities.	UNDP, GIZ, GoL	EPA, MOA, MFDP, UNDP, GIZ	1-2	Reluctance on the part of the communities to make private land available for public facilities.	The sites are identified and negotiations are ongoing for the acquisition and use of said land,	4 sites acquired and ready for use.	24,000
	3.2 Procure and install the Integrated Soil Fertility equipment in the 4 agro-ecological zones of Liberia.	UNDP, FAO, GIZ, USAID, AfDB, CTCN, EU, GoL	EPA, MOA, MFDP, UNDP, FAO, GIZ, USAID, AfDB, CTCN	1-5	Delay in securing funding or donor fatigue.	Materials/equipment are procured and available for use.	4 Integrated Soil Fertility facilities are constructed in 4 agro-ecological zones of Liberia.	2,800,000

Develop appropriate policy, legal and regulatory prescriptions for the development of the Technology.	4.1 Identify policy gaps impeding the development and transfer of the technology.	GoL	EPA, MOA, MFDP	0-1	Limited national human capacities.	Terms of reference developed, and Resource persons hired.	Policy gaps identified and documented.	5,000
	4.2 Revised and or promulgate policy and laws to facilitate the development and improvement of the technology.	GoL	EPA, MOA, MFDP	1-3	Lack of political will to revise the law.	Several policies and laws were drafted and ready for enactment.	At least three existing and laws are revised, and two new ones are promulgated.	4,500
Provide and or increase financial support to relevant institutions for enhancing their capacity to manage the development of the technology.	5.1 Conduct capacity needs assessment of institutions identified to be implementing the technology.	UNDP, GoL	EPA, MOA, MFDP	0-1	Delay in securing funding to conduct a needs assessment.	Institutional needs assessment concluded, and gaps identified.	Actions to fill gaps elaborated and documented.	5,000
	5.2 Provide soft loans as an incentive to keep the technology in operation.	GIZ, AfDB, WB, EU, UNDP, USAID, GoL	EPA, MOA, MFDP, GIZ, AfDB, WB, EU, UNDP, USAID	1-2	Lack of adequate funding.	Loan criteria developed and terms and conditions negotiated.	At least 5 institutions access funding and are capacitated and functional.	500,000
Carry out effective education and awareness on the benefits of the technology.	6.1 Develop educational and awareness modules in the use of the technology.	GoL	EPA, MOA, MFDP	0-1	Delay in securing funding.	Resource person hired to develop the education and awareness modules.	Public education and awareness modules developed.	4,500
	6.2 Provide technical and financial support for training in the use of the technology.	UNDP, EU, USAID,	EPA, MOA, MFDP, UNDP, USAID, WB, GIZ, EU	1-2	Delay in securing funding.	Training package developed and available for use.	At least four communities each within the 4 agro-ecological zones reached out to.	250,000

		GIZ, AfDB, WB, GoL						
Consider traditional knowledge to enhance soil fertility.	7.1 Survey, assess and document available and known traditional knowledge in soil fertility management.	GoL	EPA, MOA, MFDP	1-2	Reluctance on the part of traditionalists to share their knowledge.	Develop terms of reference and hire a team of consultants to conduct surveys.	Known and available traditional knowledge in soil fertility management documented.	125,000
	7.2 Develop protocols for the safe integration of identified traditional knowledge into existing scientific pools.	UNDP, FAO, GoL	MOA, EPA, MIA, MFDP, UNDP	0-1	Potential debates over methodological approaches.	Organize joint traditional-scientific forums for the inclusion of traditional knowledge into existing scientific pools.	Appropriate traditional knowledge validated, approved, and included in existing scientific pools.	30,000
	7.3 Popularize the identified traditional knowledge for wider use.	GIZ, UNDP, GoL	MOA, EPA, MIA, MFDP, UNDP	1-2	Delay in securing funding.	Develop terms of reference and hire a national consultant to develop awareness-raising modalities.	Awareness-raising package developed and implemented in at least four communities each within the 4 agro-ecological zones	25,000
	Grand Total							**3,797,500**

1.2 Project Ideas for the Agriculture Sector

1.2.1 Brief summary of the Project Ideas for the Agriculture Sector

Agriculture provides livelihood and sustenance for more than 60 percent of the population that engaged in the production of rice, cassava, rubber, cocoa, and sugarcane (CBL, 2019). Additionally, it contributes about 39.11 percent to GDP and provides employment opportunities for about 30,000 people who are employed by commercial rubber farms and up to 60,000 smallholder households involved with growing rubber trees. Notwithstanding, agriculture productivity remains low due to traditional and domestic production of Liberia's main staple foods which still depend on a traditionally low input/low output, shifting cultivation, mixed crop system. Although agricultural production has increased in recent years, yields are still well below the regional average and the post-harvest loss rate very high. As a result, the country imports 80 percent of its staple food (rice), making it vulnerable to global food price volatility. All of these are due to poor integration, lack of basic infrastructures such as machines, farming equipment/tools, farm to market roads, fertilizers, pesticides, and most importantly food storage capacity. Therefore, the project ideas are woven to address these constraints and challenges being faced by the sector. Therefore, the proposed PIs are listed below:

1. The priority investment is to establish 3 major facilities for the value addition of agricultural products (rice, cassava, vegetables, and fruits).
2. The introduction of Improved Storage (drying & freezing) – is to build 3 storage facilities for seeds, grains, and vegetables in 3 agro-ecological zones of Liberia
3. To introduce and run at least 4 Integrated Soil Fertility Management facilities in four agro-ecological zones of Liberia.

1.2.2 Specific Project Ideas for the Agriculture sector

The following are tables summarizing details of the specific Project Ideas in tables 32, 33 and 34 identified and retained by the technical working group for Liberia's Agriculture sector.

1.2.2.1. Project Idea 1:

Summarized in table 32 below is the Project idea 1; Establish 3 major facilities for the value addition of agricultural products (rice, cassava, vegetables, and fruits)

Table 32: Establish 3 major facilities for the value addition of agricultural products (rice, cassava, vegetables, and fruits)

Introduction/ Background	Adding value to a product is important for maximizing profit, and it gives recipients many choices in selecting products as per their needs. The technology is however new to Liberia. Therefore implementing it will require tactful innovations and practical approaches. Therefore, implementing this technology will require the Environmental Protection Agency of Liberia in collaboration with the Ministry of Agriculture will work hand-in-hand to implement this technology. The facilities will be built within the agro-ecological zones of Liberia to serve 5 counties each.
Objectives	The objective of this Project Idea is to establish 3 major facilities for the value addition facilities within the agro-ecological zones of Liberia that will serve the 15 counties.
Outputs	Lands, equipment, machinery available for the construction of 3 major facilities for value addition. Coordination and structure established Financial incentive package to MFDP, approved and awareness raising campaign lunched EPA) and MOA procured and delivered facilities to pre-determined sites.
Relationship to the country's sustainable development priorities;	This technology aligns with many of Liberia's development agenda to include: The Climate Change Agriculture Adaptation Project (CCAAP) Liberia Agriculture Sector Investment Programme (LASIP) Liberia National Adaptation Plan (NAPs) Liberia's Poverty Reduction Strategy (PRS)

	Agenda for Transformation (AfT) Food and Agriculture Policy and Strategy (FAPS- 2008) National Food Security and Nutrition Strategy (FSNS- 2009) The New Policy for Agricultural Advisory Services of 2009 Liberia's Nationally Determined Contributions (NDC) 2015 and 2021 National Policy and Response Strategy on Climate Change of 2018 Pro-Poor Agenda for Prosperity and Development 2018 to 2023 (PAPD)
Project Deliverables e.g. Value/ Benefits/ Messages	Best practices and technologies in rice, cassava and vegetable cultivation, livestock rearing, and marketing for food security and income generation. Appropriate systems of extension and farmer-to-farmer learning is developed. Financial incentives for the development of value addition of food crops and livestock products are provided to farmers and livestock owners. Marketing and resilient value chain for rice, cassava, vegetables and livestock products.
Project Scope and Possible Implementation	The project seeks to improve farmers' incomes and savings, and to guarantee the availability of food crops and help farmers save more money. The project will be implemented in 3 locations that will serve the 15 counties.
Project Activities	Secure funding for implementation; Meetings/training workshops Procurement of materials for the construction works of the facilities. Consultants to conduct capacity needs assessment of different stakeholders identified for training. Development of awareness materials Procurement of vehicles and motorbikes for the project team
Timelines	Considering the planning period and implementation phase, it will take between 4 to 5 years for the project to be implemented.
Budget/ Resource requirements	The estimated budget would be about USD8.3 million and funding could be both conditional and unconditional with 95% conditional funds coming from international partners and donors such as, GCF, GEF, CTCN, Swedish Embassy, and FAO; and unconditional contribution from the Government of Liberia through budgetary allotment.
Measurement/ Evaluation	The project implementation and success will be evaluated and measured by the following: The hiring of a project focal point to coordinate all of the activities Reports from project launch and inception meetings, The number of farmers and marketers trained The construction and completion of the 3 value addition facilities.
Possible Complications /Challenges	Difficulties in accessing funds to support the project; Inadequate institutional coordination Bad road conditions especially during the rainy season. Delays in getting equipment, materials from the port to be transported to the sites.
Responsibilities and Coordination	The duly implementer of this project is the Ministry of Agriculture. However, due to the sitting of the Climate Change Steering committee at the EPA, MOA will work in collaboration with the EPA to assess climate finance that would support the implementation of this project.

1.2.2.2 Project Idea 2:

Summarized in table 33 below is the Project idea 2; the introduction of Improved Storage (drying & freezing) – is to build 3 storage facilities for seeds, grains, and vegetables in 3 agro-ecological zones of Liberia

Table 33: Introduction of Improved Storage (drying & freezing) – is to build 3 storage facilities for seeds, grains, and vegetables in 3 agro-ecological zones of Liberia

Introduction/ Background	Cereals, pepper, potatoes grains, and cassava leaves feature significantly in the Liberian agriculture and diet; good storage helps ensure household and community food security until the next harvest and commodities for sale can be held back so that farmers can avoid being forced to sell at low prices. Therefore, the technology will create the environmental conditions that protect the product and maintain its quality and its quantity. The Ministry of Agriculture will provide training on good harvesting and handling of agricultural products. The Ministry of Commerce through the Standards Division for health and safety should enforce regulations and quality control guidelines, local financial institutions, and donors should provide funds and farmers' corporative who are indeed the first beneficiaries. Health and safety regulations and quality control guidelines should be elaborated by the Environmental Protection Agency (EPA). Standardized training and inspections may also be undertaken by the EPA.
Objectives	The objective of this PI is to introduce improved storage technology by building 3 storage facilities for seeds, grains, and vegetables in 3 agro-ecological zones of Liberia.
Outputs	The basic outputs include the following: Appropriate private entities with capacity and specific programs related to the technology are identified by the Environmental Protection Agency (EPA) and the Ministry of Agriculture (MOA). Facilities (drying & freezing) equipment procured and delivered particularly for storage of seeds, grains, and vegetables in 3 agro-ecological zones of Liberia by contractor.
Relationship to the country's sustainable development priorities;	This technology as well align with many of Liberia's development agenda to include: Food and Agriculture Policy and Strategy (FAPS- 2008) Liberia's Poverty Reduction Strategy (PRS) Liberia's Nationally Determined Contributions (NDC) 2015 and 2021 National Policy and Response Strategy on Climate Change of 2018 Pro-Poor Agenda for Prosperity and Development 2018 to 2023 (PAPD)
Project Deliverables e.g. Value/ Benefits/ Messages	Jobs creation will be involved in storage systems installation, operations and maintenance. Investment's opportunities exist in manufacturing and supply of in storage systems components and spare parts. The potential impact on poverty reduction and greater livelihood security for all. Increase farmer's ability to increase crop production and improve health of women and income for men and women farmers. Improved storage is an essential tool that guarantees the availability and low cost of food crops for both the farmer and consumer.
Project Scope and Possible Implementation	This project seeks to mitigate losses in agricultural crops during the peak of harvest especially during the rainy season and as well guarantees the availability and low cost of food. This project will as well complement the value addition technology since it is the idea of the Government to have agricultures hubs intended to address the issues of Climate Change. The 3 storage facilities will as well be built in 3 agro-ecological zones to serve 5 counties each.
Project Activities	Secure funding for the implementation of the project Meetings/training workshop Procurement of materials for the construction works of the facilities. Consultants to conduct needs assessment and capacity gaps at the institutional level in agriculture research. Gaps identified from the needs assessment are address to capacitate institutions working in agriculture research. Development and dissemination of awareness materials Local travel costs for participants including Daily Subsistence allowances.
Timelines	Once the required resources needed to implement this project are secured, it will take up to 4 years for the project to be implemented.

Budget/ Resource requirements	The budget for this project is USD2.99 million. This project will be support heavily by international partners and donors to include GCF, CTCN, FAO, GEF, British Government, USAID, and Swedish Government. An in-kind contribution will be provided by the Government of Liberia.
Measurement/ Evaluation	The project implementation and success will be evaluated and measured by the following: The amount of funds assessed to implement the project; Reports from the project launch and inception meetings, Reports on the equipment, materials procured Reports on the 3 storage facilities been constructed Reports on the number of beneficiaries been trained.
Possible Complications /Challenges	1) Difficulties in accessing funds to support the project; 2) Inadequate institutional coordination 3) Bad road conditions especially during the rainy season. 4) Delays in getting equipment, materials from the port to be transported to the sites.
Responsibilities and Coordination	The Ministry of Agriculture will lead in the implementation of this project and will work with EPA and relevant line ministries and agencies.

1.2.2.3. Project Idea 3:

Summarized in table 34 below is the Project idea 3: To introduce and run at least 4 Integrated Soil Fertility Management facilities in four agro-ecological zones of Liberia.

Table 34: To introduce and run at least 4 Integrated Soil Fertility Management facilities in four agro-ecological zones

Introduction/ Background	Soil fertilities decline and loss is a major impediment in agriculture production in Liberia. It has been recorded that 600,000 ha of the forested area have been lost to shifting cultivation as was reported in 2002 (FAO, 2015). Integrated Soil Fertility Management (ISFM) is important to increase productivity while maintaining or enhancing the agricultural resource base. Through stakeholders consultations and experts opinions, the Liberian stakeholders have decided to introduce and run at least 4 integrated soil fertility management facilities in four agro-ecological zones of Liberia.
Objectives	The Objective of this project is to reduce shifting cultivation (slash and burn) traditional farming practices by introducing integrated soil fertility management practices.
Outputs	The project outputs include the following: Integrated Soil Fertility equipment are Procured and installed in the 4 agro-ecological zones of Liberia. The National Legislatures revised and or promulgated policy and laws to facilitate the development and improvement of the technology. Technical and financial supports are secured to support training in the use of the technology.
Relationship to the country's sustainable development priorities;	This technology aligns with many of Liberia's development agenda to include: National Policy and Response Strategy on Climate Change of 2018 The New Policy for Agricultural Advisory Services of 2009 Liberia National Forestry Policy and Implementation Strategy of 2006 National Environmental Policy of 2003 Liberia's Nationally Determined Contributions (NDC) 2015 and 2021 Pro-Poor Agenda for Prosperity and Development 2018 to 2023 (PAPD)

Project Deliverables e.g. Value/ Benefits/ Messages	It will enhance crop productivity and quality. Provides an alternative for farmers to purchase cheap available fertilizer. Intensify agricultural production and reduces pressure for the conversion of additional lands; It is gender sensitive, can be easily used by male or female farmer.
Project Scope and Possible Implementation	This project intends to reduce shifting cultivation and to provide alternative source of fertilizers for farmers. Four (4) integrated soil fertility management facilities will be built in four agro-ecological zones of Liberia and will additionally support training of farmers.
Project Activities	Secure funding to implement the project; Conduct meetings/training workshops; Procurement of materials for the construction works of the facilities. Consultants hired to conduct studies to identify policy gaps impeding the development and transfer of the technology. Provide loans for project beneficiaries Development and dissemination of awareness materials
Timelines	Considering the planning phase and implementation phase of this project, it will take up to 4 years for this project to be implemented.
Budget/ Resource requirements	The budget for this project is USD 3.79 Million. Majority of the funds will be provided by International partners and donors to include GCF, CTCN, FAO, GEF, British Government, USAID, UNDP, and Swedish Government. An in-kind contribution will be provided by the Government of Liberia.
Measurement/ Evaluation	The project implementation and success will be evaluated and measured by the following: a) The amount of funds assessed to implement the project; b) Reports from the project launch and inception meetings, c) Reports on the equipment, materials procured d) Reports on the 4 ISFM facilities been constructed e) Reports on the number of persons received the loans.
Possible Complications /Challenges	1) Difficulties in accessing funds to support the project; 2) Inadequate institutional coordination 3) Bad road conditions especially during the rainy season. 4) Delays in getting equipment, materials from the port to be transported to the sites.
Responsibilities and Coordination	The Ministry of Agriculture will lead in the implementation of this project and will work with EPA and relevant line ministries and agencies.

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Annex I. List of stakeholders involved and their contacts

Table 35: Names and Contacts of the Agriculture Technical Working Group for the TAP

No	Name	Sex	Institution	Email	Consultation Mode
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