United Nations Industrial Development Organization

Climate Technology Centre & Network

Federal Ministry of Environment - Department of Climate Change

Federal Ministry of Science and Technology – Department of Environmental Sciences and Technology

Technology Needs Assessment and associated action plan for climate change mitigation and adaptation in Nigeria's most vulnerable economic sector

Detailed Work Plan for TNA Project Committee

Version 3.0

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Deloitte Tohmatsu Financial Advisory LLC

Contents

1. Background

Nigeria is the largest economy in sub-Sahara Africa. Although Nigeria's economy is diversifying, the country still faces a number of development and climate challenges. Nigeria has submitted its Third National Communication (TNC) to the UNFCCC in March 2020, after its First Biennial Update Report (BUR1) in 2018, and its NDC in 2015. These documents clearly highlight the challenges in mitigation and adaptation met by the country.

Although Nigeria remains a relatively small contributor to worldwide GHG emissions per capita, with 0.5 tons CO_2 equivalent in 2014, compared to 0.8 average in Sub-Saharan Africa, it is also the second largest emitter in sub-Saharan Africa, with 96,281 $ktCO_2$ equivalent. The 2016 GHG inventory, conducted as part of the TNC, show that the AFOLU sector was by far the largest source of emissions, with 60.1 percent, followed by the energy sector with 33.9 percent. Under a Business-As-Usual scenario, the TNC estimated that Nigeria should see its emissions increase by more than 58 percent until 2035.

On the adaptation side, several vulnerabilities and climate risks have been identified, such as increased droughts and floods, water scarcity, desertification, flood vulnerability and low agricultural yields, among others.

These documents have identified potential mitigation and adaptation actions, as well as potential technologies for the fulfilment of Nigeria's climate commitments. Specifically, the TNC highlighted the importance of technology transfers for Nigeria to answer to the impacts of climate change. It also highlights some of the challenges the country face in identifying and introducing technologies, such as inadequate awareness on available technologies, low capacity, poor understanding of commercial applications, Intellectual Property challenges and issues in terms of enabling environment, among others.

Within this context, Nigeria has requested the support of CTCN and UNIDO for the development of a Technology Needs Assessment (TNA) and associated action plan for climate change mitigation and adaptation. These will be used by Nigeria for the implementation of its climate action plans, and for financing requests toward climate finance sources such as the Green Climate Fund (GCF). The TNA will also need to respond to an intersectional analysis of gender differentials and the different needs, priorities and interests of women and men.

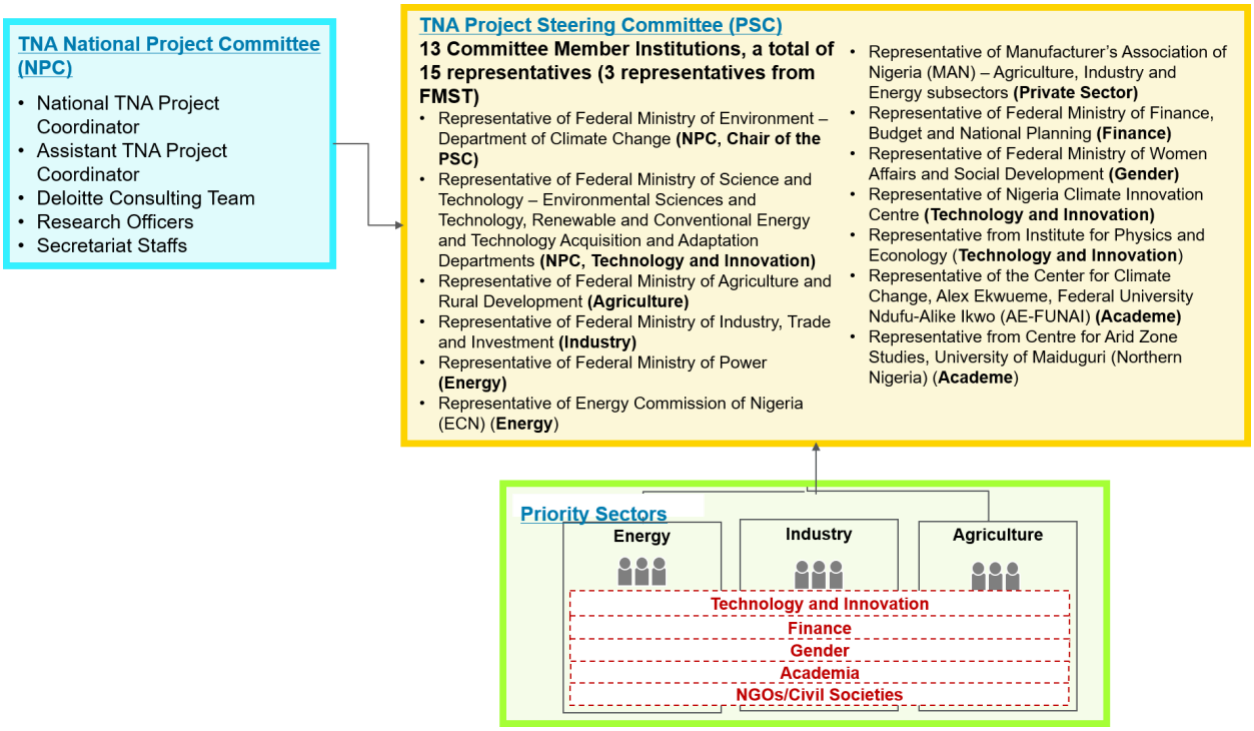
The TNA process is expected to support the setting up of coordination mechanisms to govern the TNA process and better coordinate climate action in the country, while at the same time achieving Country Programming objectives. It will encompass the identification and prioritization of technologies that can support the achievement of the country's climate objectives. The TNA and the action plan developed will provide the guidance required by Nigeria in developing its climate finance pipeline. It will bridge the gap among the technologies, enabling environment and investments.

2. The TNA Project Committee

The TNA Project Committee is established to oversee the progress of TNA and to ensure the engagement of key stakeholders throughout the TNA process. The Committee consists of a TNA National Project Committee (NPC) and TNA Project Steering Committee (PSC). The NPC is the coordinating entity responsible for the overall TNA process. The PSC is responsible for guiding and supervising the activities and outputs produced by the consulting team as well as validating deliverables submitted by the consulting team. Under the PSC, there are sectoral working groups responsible for providing inputs to both the consulting team and the PSC, in relation with the TNA process and the outputs produced.

The structure of the TNA Project Committee is illustrated in figure 1.

Figure 1: The structure of the TNA Project Committee



3. Implementation Approach

All the tasks assigned to the TNA Project Committee are planned to be implemented under three (3) activities as shown in the table below.

Table 1: List of activities

Activity 1 - Institutionalization of a coordination mechanism for the implementation of the TNA
1.1 - Conduct a stakeholder's analysis
1.2 - Support establishment of a TNA Project Committee
1.3 - Development of a work plan for monitoring and oversight
Activity 2 - Prioritization of technologies and relevant action for increased access to finance
2.1 - Pre-selection of sub-sectors for the fulfilment of Nigeria's TNA
2.2 - Pre-selection of mitigation and adaptation technologies for the fulfilment of Nigeria's TNA
2.3 - Technology Action Plan(s)
2.4 - Validation of Technology Action Plan (TAP) with stakeholders
2.5* - Support the implementation of the Technology Action Plan with communications, guidance and training
Activity 3 - Engage the private sector in Nigeria's consultative processes

**The implementation of Activity 2.5 is subject to revision of the contract between UNIDO and Deloitte Tohmatsu Financial Advisory LLC, which is based on budget availability from the GCF. The budget currently approved does not include Activity 2.5. The implementation of Activity 2.5 is subject to budget allocation from the GCF as the project progresses.*

Activity 1: Institutionalization of a coordination mechanism for the implementation of the TNA

Under this activity, a coordination mechanism for engagement with key stakeholders has been institutionalized to support the development of the TNA process. This was achieved through three sub-activities. The results of Activity 1 will feed back into Activities 2 and 3, where further stakeholder engagement will be conducted.

Activity 1.1 Conduct a stakeholder's analysis

The stakeholder analysis was conducted in identifying key stakeholders in the public, private, civil society, academia and NGOs for the sectors of focus of the TNA. The consulting team built on key stakeholders already identified in the inception workshop of TNA for climate change mitigation and adaptation in Nigeria held on September 10 – 11, 2018 where the National TNA Committee, headed by the Federal Ministry of Science and Technology (FMST) and deputized by the Federal Ministry of Environment's Department of Climate Change (FMEnv-DCC), and the National Project Steering Committee (PSC), headed by FMEnv-DCC, were established. Leveraging the list of existing stakeholders, the consulting team considered stakeholders' roles and responsibilities, capacities and expectations in the context of the TNA, and identified additional stakeholders in coordination with FMST and FMEnv-DCC.

Gender was integrated into the stakeholder analysis. This ensured equal representation of women and men as well as participation of gender focal points and associations that promote gender equality and the empowerment of women (GEEW) and other vulnerable groups.

The stakeholder analysis was refined through stakeholder consultations, conducted bilaterally, virtually through a digital meeting platform i.e. Microsoft Teams. It also leveraged inputs from FMST and FMEnv-DCC, who was been selected as the National Project Coordinator and the Deputy TNA Project Coordinator of the TNA Project Committee for this assignment, respectively.

Activity 1.2 Support establishment of a TNA Project Committee

Identification of key stakeholders for engagement and formation of sectoral working groups

In coordination with the National Project Coordinator and the Deputy TNA Project Coordinator of the TNA Project Committee, the consulting team supported the finalization of the TNA Committee in Nigeria. FMST, in collaboration with FMEnv, conducted an inception workshop in September 2018 to identify the necessary steps and to proceed with the process in undertaking TNA in Nigeria. The consulting team leveraged the existing TNA Project Steering Committee (PSC) established during this inception workshop and built on it by incorporating results of the stakeholder analysis from activity 1.1. This resulted in a full representation of key stakeholders to be involved in the TNA process under this assignment. The members of identified for the PSC include representatives from the following parties:

- Federal Ministry of Environment – Department of Climate Change (Chair of the PSC)
- Federal Ministry of Science and Technology – Environmental Sciences and Technology (Co-chair of the PSC), Renewable and Conventional Energy, and Technology Acquisition and Assessment Departments
- Federal Ministry of Agriculture and Rural Development
- Federal Ministry of Industry, Trade and Investment
- Federal Ministry of Power
- Federal Ministry of Finance, Budget and National Planning
- Energy Commission of Nigeria (ECN)
- Institute for Physics and Ecology Ltd/GTE
- Manufacturers Association of Nigeria (MAN)
- Federal Ministry of Women Affairs and Social Development
- Nigeria Climate Innovation Centre (NCIC)
- Centre for Climate Change, Alex Ekqueme, Federal University Ndufu0Alike Ikwo (AE-FUNAI) (Southern Nigeria)
- Centre for Arid Zone Studies, University of Maiduguri (Northern Nigeria)

The established TNA National Project Committee (NPC) has identified key stakeholders to engage in the TNA process, including members of the TNA Project Steering Committee (PSC) and sectoral working groups. It is the responsibility of the PSC to appoint key stakeholder groups as members of sectoral working groups and to ensure their participation and engagement during the execution of the TNA. This activity was conducted based on the stakeholder mapping and consultation report, which identified key stakeholders in the sectors of the TNA's focus.

Working groups are organized by sector of expertise and/or transversally and to provide extensive inputs throughout Activity 2 (i.e., prioritization of technologies and relevant action for increased access to finance). They include representatives of government departments that have responsibility for policy formulation and/or regulation, private and public sector industry representatives, regulators, representatives from technology suppliers, finance, technology end users (e.g., households, small businesses, farmers) and academia. Working groups and participatory members have also been defined in the TNA Project Committee Constitution.

This activity will also inform the selection of the participants for the national consultation workshop (Activity 2.4) and private sector engagement.

Development of the TNA Project Committee Constitution

The PSC will validate the TNA Project Committee Constitution, where rules and procedures of the TNA

process as well as roles and responsibilities of the different stakeholders are defined. The Constitution was drafted by the Deloitte consulting team with inputs from Federal Ministry of Environment - Department of Climate Change and Federal Ministry of Science and Technology. After its validation by the PSC, it will formally establish the TNA Project Committee.

Management office for the TNA Project Committee

The Federal Ministry of Science and Technology – Department of Environmental Sciences and Technology (FMST-DEST) functions as the National TNA Project Coordinator. The Federal Ministry of Environment – Department of Climate Change (FMEnv-DCC) functions as the Assistant TNA Project Coordinator, and supports FMST-DEST during the implementation of the TNA project. Representation from the respective coordinators is identified and confirmed as follows:

- Dr. Peter Ekweozoh – National Project Coordinator (FMST)
- Mr. Chukwuemeka Okebugwu – Deputy/Assistant Project Coordinator (FMEnv - DCC)

The National Project Coordinator and the Assistant Project Coordinator will mainly support the coordination mechanism for the implementation of the TNA process through the organization of workshop and their facilitation. The Secretariat staff will be formed within the management office team to support the effective coordination and communication among NPC members, PSC members, sector groups and other relevant stakeholders during the TNA process.

Training

Members of the PSC will be trained on the TNA process. The training will focus on quality assurance and oversight in relation to the TNA process as well as on multi-criteria analysis methodologies. More information related to the multi-criteria analysis is provided as part of Activity 2.2. The training will also include more information on stakeholder engagement tools and approaches for gender responsiveness which can be used throughout the TNA process.

Activity 1.3: Development of a work plan for monitoring and oversight

The PSC will review and validate the TNA Project Committee work plan developed by the consulting team. It details activities and methodology employed for the TNA Project Committee to complete the TNA process.

To take stock of the activities conducted by the consulting team and provide recommendations to it, members of the PSC are expected to attend at least four (4) steering committee meetings. In order to support better stakeholder engagement and to reduce the number of meetings, these meetings should be linked with key milestones of Activities 2 and 3. A schedule and agenda of meetings are provided in the table below. (Venues to be decided by NPC and PSC)

Table 2: Meeting schedule

Meeting	Indicative date	Venue	Agenda
#1	April 2021	To be determined by NPC and PSC	▪ Validation of the TNA Project Committee Constitution (Activity 1.2) ▪ Validation of the TNA Project Committee work plan (Activity 1.3) ▪ Report on the pre-selection of subsectors (activity 2.1)

			▪ Report on the first and second training / consultation workshop with the private sector (activity 3.1)
#2	July 2021		▪ Report on the pre-selection of mitigation and adaptation technologies (activity 2.2) ▪ Report on the third training / consultation workshop with the private sector (activity 3.1)
#3	October 2021		▪ Progress report on the drafting of the Technology Action Plans (TAPs) (activity 2.3) ▪ Report on the fourth training / consultation workshop with the private sector (activity 3.1)
#4	January 2022		▪ Report on the Technology Action Plans (TAPs) (activity 2.3) ▪ Report on the fifth training / consultation workshop with the private sector (activity 3.1)

**Please note, Activity 2 to Activity 3 are included to provide context on other related activities to be performed on the project. Activity 1.2 captures the key components of this work plan.*

Activity 2: Prioritization of technologies and relevant action for increased access to finance

Under this activity, technology solutions for climate mitigation and adaptation will be identified and prioritized. Based on the technologies identified, action plans which will enable Nigeria to improve its access to finance and climate finance will be developed.

Activity 2.1: Pre-selection of sub-sectors for the fulfilment of Nigeria's TNA

Under this activity, relevant sub-sectors within the three priority sectors (agriculture, energy and industry) that will be covered under the TNA will be identified. The PSC will first provide the consulting team with inputs on the proposed methodology for the selection of the priority sub-sectors.

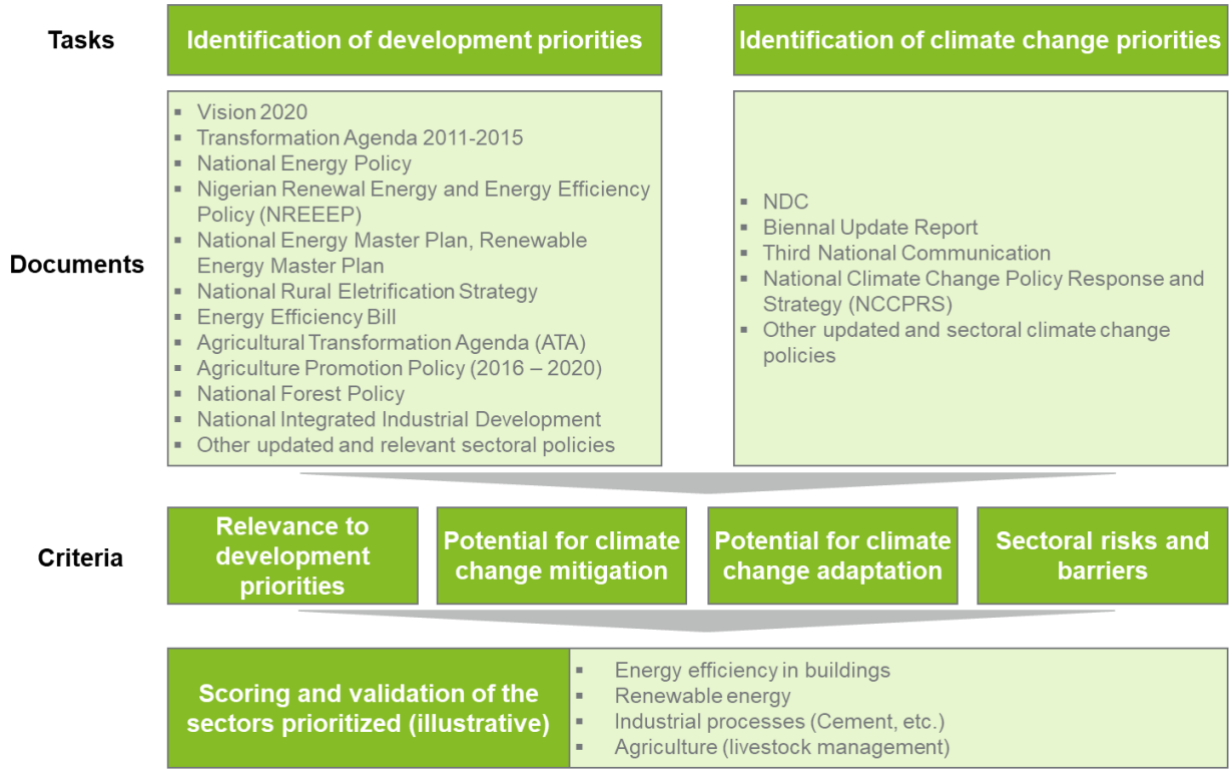
The methodology developed will take into account climate vulnerabilities, the impact of sectors on GHG emissions, as well as the overall development context, using a performance matrix based on the following criteria:

- Relevance to development priorities, including economic and social priorities
- Potential for climate change mitigation (potential for GHG emission reduction)
- Potential for climate change adaptation (potential to increase the country's resilience in a specific sector)
- Overall sectoral risks and barriers, including regulatory, institutional, financial and information related challenges

The PSC is expected to confirm if these criteria will suffice for the prioritization or if any other criteria need to be considered.

As part of the second step, the consulting team will review climate change priorities of the country. This will include a review of the NDC, BUR and TNC, as well as other relevant documents. The consulting team will also take into consideration the ongoing update to its NDC where possible. The consulting team will especially focus on vulnerabilities and climate change induced risks for adaptation related sectors, and on GHG emission contribution for mitigation related sectors. Sectors will be divided in sub-sectors following IPCC categorization or country specific categorization. The illustrative process as well as an illustrative list of documents to be review are detailed below.

Figure 2: Illustrative process for the identification of sub-sectors



Once the (sub) sectors are prioritized, the consulting team will prepare a long-list of technologies. This will constitute the basis for discussion and selection of technologies in Activity 2.2. The long-list will consider the scale of application (large industries, small holders) as well as the estimated time required for their introduction. The PSC will review the long-list developed by the consulting team and provide feedback.

The outcomes of the scoring will be validated by key stakeholders in sectorial working groups. The working groups will provide more depth and details about the barriers in each sector and potentially applicable technologies to the local context.

Based on the above activities, PSC will review the following reports that will be prepared by the consulting team :

- A report describing the methodology utilized for sector and sub-sector selection and prioritization, including the rationale and an executive summary; and
- A report on sub-sectors stakeholders' validation workshop.

Activity 2.2: Pre-selection of mitigation and adaptation technologies for the fulfilment of Nigeria's TNA

The aim of this activity is to validate and prioritize key technologies aligned to Nigeria's NDC and country priorities. This will be done through a multi-criteria analysis (MCA) and market assessment for technology selection that considers endogenous capabilities, natural resources, skills base, NDC focus areas and sectoral plans through a participatory process for the fulfilment of Nigeria's TNA.

The PSC will develop a set of criteria for the prioritization process of technologies jointly with the

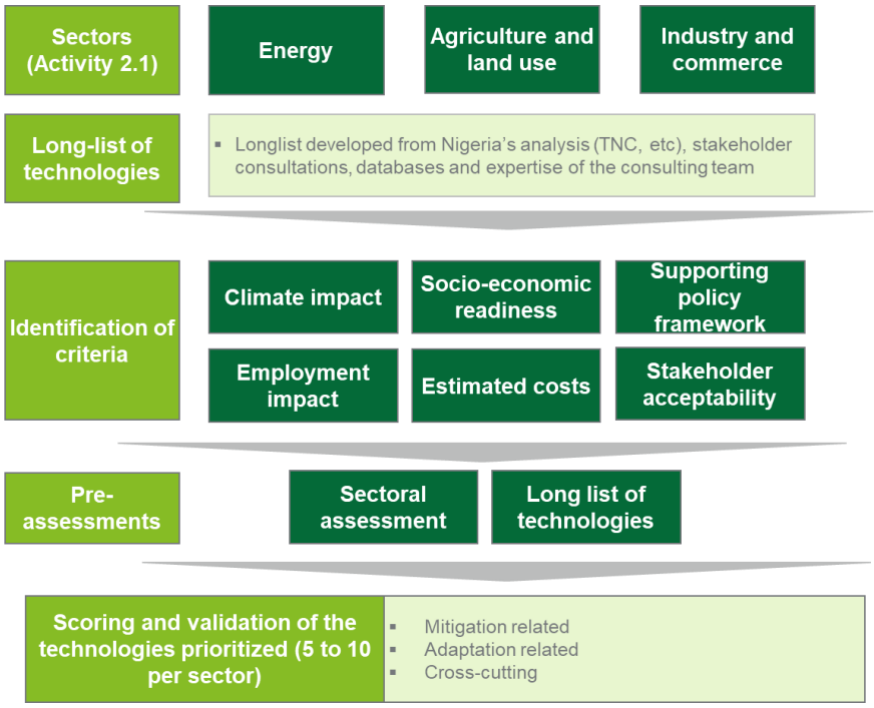
consulting team. The following is an illustrative list of criteria identified by the consulting team.

- Climate impact:
  - Technology impact potential in terms of Nigeria's GHG emissions reduction targets (conditional and unconditional)
  - Technology impact in terms of climate resilience (adaptation) for Nigeria
  - Contribution to Nigeria's NDC commitments
  - Qualitative analysis of the co-benefits (mitigation and adaptation) in terms of both environmental and social perspectives resulting from the implementation of technologies prioritized.
- Socio-economic readiness (including of value chains):
  - Maturity of industry
  - Device technology research requirements
  - Technical skillset and competency
  - Infrastructure requirements
  - Stakeholder acceptability
- Supporting policy framework (regulatory, institutional, financial and information frameworks), including sectoral plans
- Employment impact / impact on the economy
- Estimated cost (scale of investment required)

Once the list of criteria is finalized, a series of validation workshops will be conducted per sector with key stakeholders to select the final technologies from the long-list developed in Activity 2.1. The workshops will be facilitated by members of the TNA Project Committee with support of the consulting team. Working groups of the TNA Project Committee will be involved at this stage. The consulting team will provide participants with the long-list of technologies, technology factsheets (up to 5 to 10 technologies per sector), the selection criteria as well as the reports on sectoral priorities developed as part of Activity 2.1, allowing key stakeholders to make informed decisions during the workshops.

During the workshop, technologies will be scored by members of relevant working groups according to the criteria established. Weights will be attributed to each criterion, and a final list of technology per sector will be elaborated. A maximum of 5-10 technologies per sector will be prioritized. This will include technologies related to climate change mitigation and adaptation. This process is illustrated in the figure below.

Figure 3: Illustrative process for the identification of technologies



The results of this activity will be summarized by the consulting team in mitigation and adaption TNA reports, as well as in a report detailing the technology prioritization process. The consulting team will also develop report of the three validation workshops that elaborate multi-criteria analysis, market assessment and participatory process conducted as well as three TNA fact sheet briefs, summarizing main findings, recommendations and next steps. PSC will review and provide inputs to all the reports that will be prepared by the consulting team.

Activity 2.3: Technology Action Plan(s)

Under this activity, TAPs will be developed for the priority technologies identified in Activity 2.2. Starting points for the development of TAPs will be the elaboration of detailed project ideas, which will include comprehensive timeframes and estimated costs. The elaboration of project ideas will feedback into the TAPs. The detailed outline for project ideas and TAPs will be drafted by the consulting team and finalized upon discussion with members of the PSC and sectoral working groups. Members of the relevant working groups will also provide the consulting team with inputs to develop the TAPs including project ideas. The PSC will review the TAPs throughout its drafting.

Table 3: Illustrative outline of Technology Action Plans

Outline	Details
Sectoral overview	Analysis of the sector, long-term development objectives / priorities, climate impact of the sector and impact of climate on the sector
Institutional framework	Main stakeholders involved in the sector, including roles and responsibilities
Value chain analysis	The analysis will enable to identify entry points for policy development
Overview of barriers	Regulatory, institutional, financial and informational barriers for the sector – this should enable to identify clear risks for the implementation of project ideas as well as entry points for policy development
Project ideas	Which should at least include:

	▪ Objectives and outputs in relation to national policy objectives ▪ Barriers specific to the technology, assessment of the enabling environment ▪ Market assessment, which will include an analysis of financial schemes, value chains and risks to implementation ▪ Gender assessment of the technology ▪ Activities: activities should clearly address sectoral and technology specific barriers. These can include policy development, broader enabling environment development, development of financial incentives, introduction of the technologies, support to innovation, among many others ▪ Potential climate change impact and technology impact ▪ Monitoring and evaluation methods ▪ Financial assessment (or cost assessment), including cost indications ▪ Options for financing: will be addressed either at project idea level or at sectoral level. This will include the identification of potential financing sources
Innovation and R&D	Based on the list of technologies and project ideas, innovation and R&D potential will be explored. Options for fostering national innovation will also be explored
Capacity building needs	Based on the above, capacity building needs will be identified

Based on the analysis and assessments conducted under Activities 2.1 and 2.2, the barriers and risks, as well as the required actions and financial resources to introduce new mitigation and adaptation technologies will be identified by the consulting team. Members of the relevant working groups will provide feedback to the consulting team regarding the necessary measures to remove the barriers and risks through interviews. Actions and measures will be identified to remove the barriers and risks specific to the technologies and sectors. These may include the review of the policy and regulatory framework, for example to introduce new regulations, capacity building measures or funding modalities. The activities should directly address the barriers identified. Each TAP will also be developed to be financially robust to enable funding to be secured and will identify responsible authority for implementation.

PSC will review and provide input to the following report which will be prepared by the consulting team:

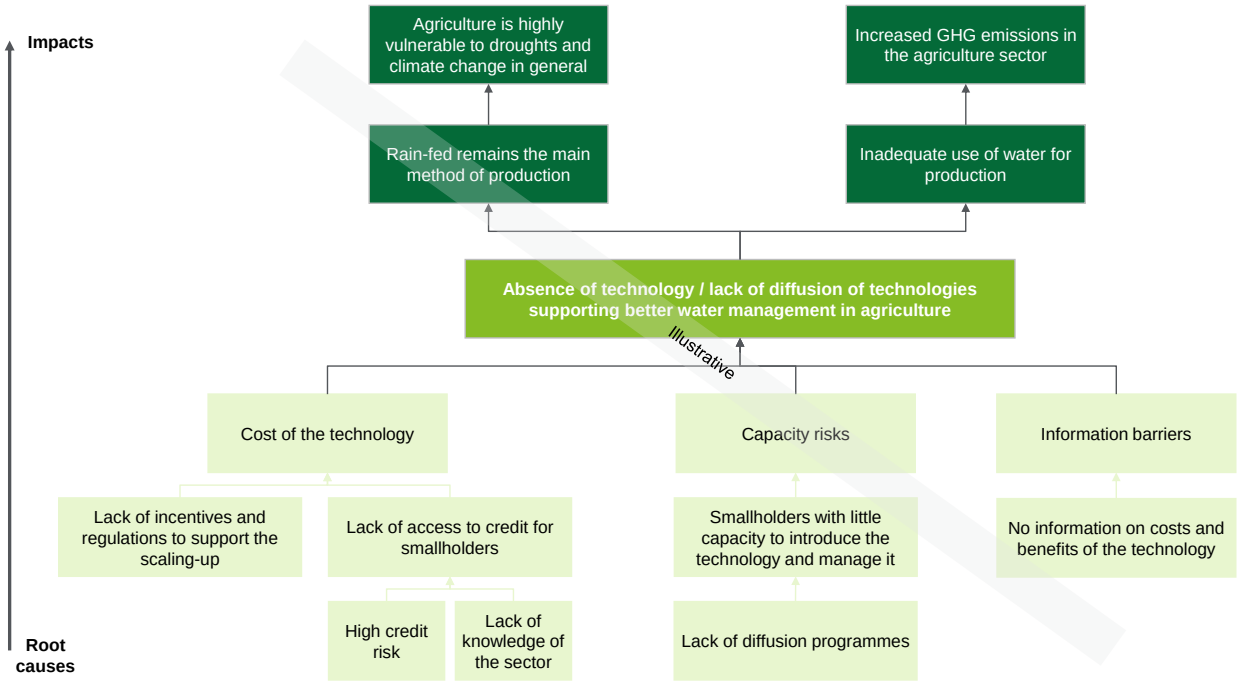
- Report and executive summary of each Technology Action Plan for each of the priority technologies in compliance with the TNA, including project supports and project ideas as concrete actions for implementation.

Activity 2.4: Validation of Technology Action Plan (TAP) with stakeholders

Under this activity, the TAPs will be validated with key stakeholders through the implementation of three sectoral workshops. This activity aims to present the results of Activity 2.3 to key stakeholders, receive feedback and reflect it on the TAPs.

The workshops will enable the PSC and the consulting team to provide an extensive overview of the TAPs and project ideas, including the expected activities and financing. In order to clearly address these, logical problem analyses and problem trees will be leveraged, which will show to what extent specific technologies address specific issues and lead to the outcomes as defined by the TAPs. An example of a problem tree is provided below.

Figure 4: Illustrative problem tree (water management in agriculture)



To foster local ownership, the consulting team will encourage the TNA Project Committee to lead the facilitation of the workshops as well as some of the presentations. The consulting team will provide technical support for the preparation of the workshops, and presentations during the workshops.

The consulting team will deliver the following activity and report:

- Meeting report of the workshop for the validation of technology action plan and analysis of co-benefits (minimum of three (3) workshops to be conducted); and
- Report outlining the implementation of the coordination mechanism.

Activity 2.5*: Supporting the implementation of the Technology Action Plan with communications, guidance and training

Under this activity, a capacity building package for key stakeholders will be developed by the consulting team. This will include the development of support material and training for the development and application of the technologies included in the TAPs. The PSC will provide input and feedback to the six regional capacity building packages developed by the consulting team. The PSC will review and provide inputs to the contents of the trainings before being finalized. The steering committee will also validate the Terms of References to be shared with GCF, which will present the training workshop contents, such as the schedule and agenda for the workshops, the modules, the trainers and the methodology, prepared by the consulting team.

The workshops are expected to be developed across two days and modules are expected to include:

- Training related to the technologies prioritized in the TAPs: this should include market mapping and problem trees;
- Gender awareness training; including an overview of the sectoral and technology gender analyses and the importance of, and tools for, mainstreaming gender into climate change action plans.
- Access to financing, with an emphasis on climate finance sources and domestic sources of finance;
- Technical aspects, operation, maintenance and data collection for the operationalization of TAPs;

- Introduction to energy data assessment and modelling tools, such as the long-range energy alternatives planning system, and similar tools in other sectors.

The PSC will also discuss the contents of the following documents prepared by the consulting team as well as provide inputs and feedback to them:

- Dissemination strategy;
- Market assessment report which will include analysis of financial schemes, value chains, risks and overall barriers to implementation of the TAP;
- One policy brief per sector, which will include selected information from the TAP, such as project ideas, barriers and long term objectives; and
- Report on advanced energy models, capability and data inventory analysis to quantify costs of effective measures by sector and sub-sector; and
- Workshop reports on each of the six regional workshops, including materials, a full list of participants, photo documentations, etc.

**The implementation of this activity is subject to revision of the contract between UNIDO and Deloitte Tohmatsu Financial Advisory LLC, which is based on budget availability from the GCF. The budget currently approved does not include Activity 2.5. The implementation of Activity 2.5 is subject to budget allocation from the GCF as the project progresses.*

Activity 3: Engage the private sector in Nigeria's consultative processes

Under this activity, six workshops aiming at engaging the private sector will be conducted. The workshops will be conducted throughout the TNA process. Engaging the private sector during the TNA process will inform the design of measures reinforcing the enabling environment and encouraging private sector investment in the technologies. It will allow the identification of acceptable project ideas in which the private sector can contribute, as well as to support the development of partnerships.

Private sector engagement will enable the TNA Project Committee to gain better understanding related to market readiness of the technologies, to the readiness of the private sector for their introduction and about barriers and challenges experienced by the private sector.

The tentative agenda for the consultation workshops is detailed below.

Meeting	Indicative date	Agenda
#1	March 2021	▪ Pre-identification of barriers and potential per sector ▪ Pre-assessment of the readiness for climate change related technologies
#2	Apr 2021	▪ Identification of barriers and potential for private sector investment in specific sectors (activity 2.1) ▪ Pre-assessment of potential for technologies
#3	Jul 2021	▪ Identification of technologies with potential for private sector investment (activity 2.2) ▪ Identification of barriers and challenges for the private sector in introducing technologies
#4	Oct 2021	▪ Stakeholders consultations around project ideas (activity 2.3) ▪ Potential sources of financing and private sector investment (activity 2.3)
#5	Jan 2022	▪ Presentation of the TAPs to the private sector for inputs (activity 2.4)

#6	Mar 2022	▪ To be determined based on discussions with stakeholders: training related to accessing climate finance, operationalizing concept notes and TAPs, etc.

The specific agenda and timings for workshops will be discussed between the TNA Project Committee and consulting team. Some of the consultations with the private sector could be closely aligned with other workshops, such as the validation workshops for sub-sectors and technologies implemented in activities 2.1 and 2.2.

4. Work Schedule

4.1 Implementation Timelines

The activities described above will be conducted according to the following implementation schedule, within the period of 18 months, but not later than 31 March 2022.

Figure 5: Implementation timelines