Inception Report

Conduct a climate change risk and vulnerability assessment of agro-ecological zones of Nepal and appraising climate change adaptation measures in agriculture

September 2017

## Acronyms

|  |  |
| --- | --- |
| ADB | Asian Development Bank |
| CBA | Cost-Benefit Analysis |
| CC | Climate Change |
| CCA | Climate Change Adaptation |
| DSCWM | Department of Soil Conservation and Watershed Management |
| DWIDM | Department of Water Induced Disaster Management |
| EbA | Eco-System Based Adaptation |
| E&S | Environmental and Social  |
| FAO | Food and Agriculture Organization |
| GCF | Green Climate Fund |
| GLOF | Glacial Lake Outburst Flood |
| ICIMOD | International Centre for Integrated Mountain Development |
| IPCC | Intergovernmental Panel on Climate Change |
| IPCC- AR5 | 5th Assessment Report of Intergovernmental Panel on Climate Change |
| MoAD | Ministry of Agricultural Development |
| MoF | Ministry of Finance |
| MoFALD | Ministry of Federal Affairs and Local Development |
| MoFSC | Ministry of Forest and Soil Conservation |
| MoLD | Ministry of Local Development |
| MoPE | Ministry of Population and Environment |
| NAP | National Adaptation Plan |
| NAP-Ag | National Adaptation Plan – Agriculture |
| NPD | National Project Director |
| NPMU | National Project Management Unit |
| UNDP | United Nations Development Programme |

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## Objective

The key overall objectives of the assignment are to:

1. **Identify and appraise adaptation options for agricultural practices** in agro-ecological zones covering Dailekh, Bardiya and Mugu districts based on their incremental cost/benefits, taking into account climate change.
2. **Prioritize adaptation measures in agriculture** to reduce climate risk and climate change-induced disaster risks, in the context of current agricultural practices and strategies as well as valuation of watershed ecosystem services.
3. **Prepare an Investment Framework** for the prioritized, most viable agricultural adaptation options that are congruent to GCF investment criteria and Nepal National Adaptation Plan (NAP) priorities.
4. **Strengthen capacities within MoAD, MoLD and local governments** to make use of tools such as applied economic valuation of ecosystem support services and cost benefit analysis as a means to evaluate and prioritize agricultural CCA options.

## Scope of work

To achieve the above mentioned objectives various tasks will be undertaken in the scope of work:

1. Identification/delineation of agro-ecological zones and ecosystem services across the three river basins (Mugu, Karnali and Babai) encompassing the three identified pilot districts:
* Review and stock take relevant sources of information related to pilot districts.
* Develop criteria to identify agro-ecological zones with consideration of relevant ecosystem services and agro-ecological zones in the districts at watershed scale.
* Validate the agro-ecological zones through consultative meeting with NPMU, local authorities and affected population.
* Present the identified agriculture hotspot (within three identified watersheds) options within three pilot districts.
1. Synthesize Vulnerability and Disaster Risk Assessment and tools/methods for environment and social safeguard and gender assessment:
* Synthesized tools to assess the agriculture vulnerability and risk assessment relevant to three watersheds zone.
* Undertake review of best practice methods and tools to synthesize protocol to assess environment and social safeguard and gender assessment in three pilot districts.
1. Compile comprehensive climate vulnerability, disaster risk, adaptation assessment in three pilot districts:
* Review relevant hazard maps prepared by DSCWM in the three targeted watersheds to inform assessment
* Apply synthesized tool in the field to assess the vulnerability and risk assessment in the watersheds
* Validation of assessment through participatory and consultative process (with affected population and local authorities)
1. Apply economic valuation of ecosystem support services and investment appraisal tools of agriculture adaptation practices relevant to priority watersheds and targeted local communities in three districts:
* Review of best practice materials and institutional stock taking of applied economic tools in natural resource management sectors from relevant sources.
* Determine the most suitable methods and tools for conducting Cost-Benefit Analysis (CBA) of agricultural adaptation practices in the case of Nepal including applied economic valuation of most relevant and quantifiable selected ecosystem services.
* Apply tools on economic appraisal of adaptation options using valuation of ecosystem support services and investment appraisal.
* Prepare and validate methodological paper on approaches for economic valuation of priority agriculture sector adaptation options in Nepal.
1. Conduct (CBA) of potential agricultural Ecosystem based Adaptation measures/practices in three pilot districts, taking into account ecosystem services valuation:
* For each watershed area, apply CBA to appraise *at least three* priority agricultural CCA measures/practices,
* Prepare and share synthesis and detailed report with national stakeholders.
1. In close consultation with key stakeholders, prioritize adaptation measures options based on results of above and other factors.
* Prepare environmental and social safeguard action plan relevant to priority agricultural CCA measures/practices selected above for each of three watersheds/agro-ecological zones.
* Prepare an action plan for inclusion of women’s and marginalized groups, based on assessment of risks and planning entry points to promote gender equality.
* Develop environmental and social safeguards framework relevant to priority agricultural CCA measures/practices selected above for each of three watersheds/agro-ecological zones
1. Formulate an investment framework incorporating a theory of change/logical framework
* Develop practical investment framework approach paper for three agro-ecological zones of Nepal taking into account GCF investment criteria and logic framework
* Identify and undertake assessment of potential investment models/options to catalyze finance for the identified options under a public-private partnership model
* Validation of models through participatory and consultative process with affected population and local authorities
1. Integrate Climate Change Economic and Investment Appraisal Criteria into internal MoAD/MoLD Project Preparation Guidelines
* Review and take stock of existing mechanisms and project preparation guidelines in use by MoAD and MoLD for the ADS
* Identify gaps in current process of program design and of appraisal to integrate climate change.
* In close consultation and collaboration with UNDP’s regional climate finance experts working on mainstreaming climate change into budget formulation processes in MOAD, produce an assessment report to integrate climate change economic and investment appraisal criteria based on consultation with district, regional and national level
* Prepare and share concise policy memorandum with key stakeholders advising on required reforms, to incorporate in internal MoAD project prepare guideline.
1. Develop hand book materials, training module and conduct training to national and sub national actors integrated into capacity building approach of NAP-Ag.
* Develop training module on climate vulnerability and disaster risk assessment, applied economic valuation of ecosystem services, and application of CBA techniques to adaptation planning in context of agricultural-sector adaptation strategies for Nepal.
* Conduct 1 national level training on the methods using tools for climate change risk, vulnerability and disaster risk assessment, applied economic valuation of ecosystem services to the agriculture sector and cost benefit analysis of agriculture adaptation practices in Nepal.
* Conduct 1 training for sub-national level government officers, building on learning from above
* Finalize handbook/internal guidelines relevant officials (such as MoAD planning and budget officers as local government actors) to improve programme prioritization linked to appraisal incorporating climate change costs and the incremental economic benefit of priority practices.

## Methodology

Agro-ecological zones highly vulnerable to climate change and climate-induced natural disasters based on the vulnerability assessment indicators across the river basins covering each of the three pilot districts namely Dailekh, Bardiya and Mugu. To study the Climate Change risk impact on, the watershed concept is adopted.

Nepal has a varied climate mainly due to presence of valleys and high altitude mountain ranges transitioning within a short distance. Climate risk assessment studies carried out by Asian Development Bank (ADB) indicated three major risks for the country- i) threat to quantity and quality of water ii) impacts on agricultural yield and food security iii) threat to biodiversity and natural resources. Below is an assessment of predictions made by different climate models till 2030, 2050 and 2080.

|  |  |  |
| --- | --- | --- |
| Climatic phenomenon | Projection | Impact |
| Rainfall | Intensify (but highly uncertain due to altitude variation) | * Increased extreme events, flood, landslides
 |
| Temperature | Rise | * Water scarcity, alteration in vegetation pattern in high altitude
* Increased invasive species in forests
* Increased incidence of forest fire
* Increased burden of vector borne diseases
 |
| Retreating glaciers, glacier melt | Increase | * Reduced flow of water for agricultural use
* Flash floods due to Glacial Lake Outburst Flood
 |

Agriculture is a major sector of the country’s economy. The sector depends on water sourced from snow, ice, and glacial melt. Due to retreating glacier, the prospects of reduced water supply during the dry season are becoming imminent, posing long term threat to the sector. Also, increased temperature and rainfall variability have resulted in shifts in Nepal’s agro-ecological zones, prolonged dry spells, and higher incidence of pests and diseases. (Ahmed, 2014)

The present assignment is a natural extension of activities already being carried out by UNDP in agro-ecological zones of Nepal. UNDP is implementing EbA in the watersheds of Harpan in Panchase area, identified as a hotspot due to severe impacts of climate change observed in terms of water scarcity, pest infestation in crops, the area’s proximity to Phew lake (a Ramsar site) and the diversity of orchid species in the region.

UNDP considers Eco-System Based Adaptation (EbA) in the watersheds of Nepal as one of the most appropriate solutions to some of these climate change adversities as it is more aligned to the livelihood and the EbA options are promising approaches to reduce social vulnerability for sustainable and efficient adaptation to climate change. Moreover, EbA is a part of overall adaptation and takes into account multiple social, economic and cultural co-benefits for local communities. It encompasses adaptation policies and measures that take into account the role of ecosystem services in reducing societal vulnerability, through multi-sectoral and multi-level approaches. (Andrade, et al., 2012). In the current study focus will be given on integration of EbA approaches in climate change adaptation measures as per the principles delineated in references such as:

* <https://portals.iucn.org/library/node/46555>
* <https://portals.iucn.org/library/efiles/documents/2011-064.pdf>
* <https://www.google.co.th/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjRjZmyoerVAhVFNo8KHReLCpUQFggrMAA&url=https%3A%2F%2Fwww.international-climate-initiative.com%2Ffileadmin%2FDokumente%2F2017%2F170516_EbA_IIED.pdf&usg=AFQjCNH9PIIE1aw0ZJLhPalwAYZv9f7KCw>
* <https://unfccc.int/files/parties_observers/submissions_from_observers/application/pdf/754.pdf>

The core principles of EbA approach can be a foundation for considering EbA in overall policy making and planning and they build on the Cancun Adaptation Framework Principles established at the UNFCCC COP16. The key aspects of EbA principles are:

* **Is about promoting the resilience of both ecosystems and societies:** ensuring that local stewardship enhances both livelihoods and ecosystem management
* **Promotes multi-sectoral approaches, and will ensure:** cooperation across multiple levels and sectors to avoid conflicting priorities and mandates
* **Operates at multiple geographical scales:** landscape-scale approaches and impact assessments are important to identify cumulative and indirect drivers of vulnerability
* **Integrates flexible management structures that enable adaptive management:** decentralized management to the lowest appropriate level to foster greater efficiency, effectiveness, equity and ownership
* **Minimizes tradeoffs and maximizes benefits with development and conservation goals to avoid unintended negative social and environmental impacts:** participatory planning, recognizing the needs of the poorest and most vulnerable is essential. Current vulnerabilities and needs for resources and development need to be balanced with the preparation for longer-term climate change impacts, which take into account the limits of ecosystem functioning and the varying temporal scales and lag effects of ecosystem processes
* **Is based on the best available science and local knowledge, and should foster knowledge generation and diffusion:** agencies implementing EbA should facilitate networks to ensure that information is regularly updated and provided in easily usable forms, and that the media used for knowledge sharing are culturally appropriate and understandable
* **Is participatory, transparent, accountable, culturally appropriate and actively embracing equity and gender issues:** planning should focus on equality and the special needs of marginalized social groups and promote active, free, meaningful and full participation of stakeholders

Some of the key considerations for EbA approach (Best Practices on Planning, Implementing and Monitoring & Evaluating Ecosystem-based Adaptation to climate change):

* EbA measures lack proof of their effectiveness. Hence, conventional grey infrastructure, already known, is often favoured by decision-makers. Furthermore, there is an already established market-system for the construction and implementation of hard/grey infrastructure, while only few implementing agencies and constructing companies are engaged in EbA measures.
* Knowledge about the EbA approach, risks and impacts of climate change as well as the interaction of climate change and ecosystems needs to be disseminated among decision makers and public administration technicians. The capacity building about the EbA concept must be fed with action and real implementation to demonstrate the effects of the measure
* The EbA approach considers human beings as the focal point. Therefore, the involvement of the civil society and the acceptance of the EbA measures by the civil society are crucial for a successful implementation of EbA measures and for upscaling pilot measurements.

In the present study, PwC will carry out the tasks as mentioned in the figure below:



As a first step, the logic for selecting the watersheds will be applied as follows:

* Besides the direct rainfall, the major source of water for agriculture is river water
* Any agro based structural intervention (e.g. check dams) at upstream of watershed benefits the lower part of the watershed.
* Water availability for agriculture depends on ecological and biodiversity condition of upper part of the watershed
* Flood and drought risks, generally major disasters in Nepal, could be controlled or managed from upper part of the watershed
* The social and livelihood of people are more connected with the watershed rather than political boundary of the districts
* Since climate change impacts could be effective within watershed boundary, political boundary may not be effective for core analysis.

Considering the above concept, 3 river systems (Mugu, Karnali and Babai) are selected which flows from these three districts. The criteria of selection are:

* Rivers of greatest benefits for the districts
* Watershed that could intervene at upstream for agro benefits in a district
* Rivers that could be used for gravity flow advantage so that it provides direct benefit to the districts
* Perineal river that is reliable to agriculture

Next, we will evaluate the existing tools on vulnerability and disaster risk assessment in terms of their alignment with the 5th Assessment Report of Intergovernmental Panel on Climate Change (IPCC-AR5) and the framework being followed under National Adaptation Plan (NAP). The detailed methodology report covering the various tools evaluated and their applicability for this study will be submitted.

The tool so selected will be used for spatial analysis of the identified watershed. Field assessment and stakeholder consultations will be carried out to validate the findings of the spatial analysis. This on-field assessment will be carried out using participatory methods such as focused group discussions (with local community), one to one consultations (with NGOs and local authorities), etc. Progress report on field visits, focused group discussions and one on one consultation will be submitted subsequently.

The field assessments will also be used for identifying potential adaptation measures and also capture mitigation benefits (as co-benefits)ptions. These options will be prioritized based on – Environmental and Social (E&S) and gender impacts as identified from field assessment, scalability of the interventions, sustainability of the interventions in the long term by the local community and climate change relevance of the potential measures so that options are not seen as only developmental interventions. A feasibility assessment report with regard to this analysis will be submitted.

We will review the available national and international guidelines and frameworks on ecosystem evaluation techniques. Based on the review, we will suitably modify the Cost Benefit Assessment (CBA) methodology developed for the mountain ecosystem (as per the previous study conducted by PwC under the GCF Readiness Programme) to include the features of the agro-ecological zones. The modified CBA methodology will be used for economic evaluation of the prioritized options. The ecosystem valuation will be conducted in the context of identified EbA measures, mitigation co-benefits of the EbA measures and will also capture the incremental developmental gains in a “with-project” scenario. Moreover, the CBA also finds the “Climate Chang Relevance” of the project and will consider the long term adaptation benefits over the life of the project.

We will then develop the investment and logical framework for the selected EbA options. This framework will be in line with GCF criteria and will incorporate the concept of “Theory of Change”. We will consider mainstreaming of climate change interventions into the existing planning and budgeting schemes of the country. We will also emphasize on integration of climate change interventions into the internal guidelines of MoAD/MoLD. The designed investment and logic framework will be discussed with the policy makers, relevant line agencies, service providers and community groups and their feedback will be incorporated to enrich the framework. A final project report will be produced incorporating key inputs from all progress reports, methodologies and tools used, stakeholder consultation output, etc. for submission to UNDP.

We understand that a similar study is being jointly undertaken by the Food and Agriculture Organization (FAO) and ADAPT Nepal. The project aims to support Nepal in integrating climate change vulnerability and risk assessment as well as institutional capacity building in adaptation sensitive planning and budgeting into the National Adaptation Plans (NAPs). The three pilot districts chosen for this study are same as well i.e. – Mugu, Dailekh and Bardia. We understand that the project has been commenced a few months before our assignment.

In order to utilize the work already being carried out by FAO and ADAPT Nepal, we will be coordinating with UNDP team to facilitate the sharing of findings of the FAO and ADAPT Nepal vulnerability and disaster risk assessment study.

Basis the review of the Inception Report of ADAPT Nepal received through UNDP, the following steps are overlapping vis-à-vis our approach and methodology. Hence we have indicated against the steps, in the subsequent table, where we can derive synergies through coordination and exchange of information with FAO/ ADAPT Nepal facilitated by the UNDP project team. The common steps are as follows:

* Development and finalization of tools for vulnerability and risk system
* Preparation of pilot district agriculture profile, agro-climatic, land use and Climate Change –Vulnerability /Risk (CC – V/R) maps using GIS tool
* Conduct participatory vulnerability and risk assessment in agriculture sector at the most appropriate scale
* Prioritization of adaptation options at the most appropriate scale

| Step # | Step | PwC Approach | PwC Methodology | Deliverable | Inputs from ADAPT Nepal/FAO assignment (if any) |
| --- | --- | --- | --- | --- | --- |
| 1 | Inception  | Inception meeting  | There will be an inception meeting with the UNDP Project Team, the Ministry of Finance (MoF) and the Ministry of Agricultural Development (MoAD). We will discuss and agree on the following:1. PwC and UNDP contact points throughout the project duration
2. Work plan and timeline for each step
3. Roles and responsibilities of each team member
4. Documents, authentic references to be used for desk based review
5. List and contacts of stakeholders to be consulted during the project
6. Mechanisms to be followed for conducting the consultation meetings, workshops (venue, dates, arrangements)
7. Meeting with the National Project Director (NPD) – Mr. Lal B. Khatri, MoAD officials and Project Management Unit of National Adaptation Plan
 | Inception report  |  |
| 2 | Identification of vulnerable agro- ecological zones within the three watershed | Spatial Analysis  | To study the Climate Change risk impact on agro-ecological zones in Dailekh, Bardiya and Mugu districts, the watershed concept has been adopted. Three river systems (Mugu, Karnali and Babai) selected flows through the abovementioned three districts. The basis for selection of rivers are:* Most significant rivers for the districts to be selected
* Watershed that can intervene at upstream for the agro benefit in the district
* Rivers that could be used for gravity flow advantage so that it provides direct benefit to districts.
* Perineal rivers that are reliable to agriculture

Literature review of existing studies on vulnerability and risk assessment indicators selected will be referenced as footnotes so as to justify the selection process. | Criteria Method Report  |  |
| Consultation with stakeholders  | The information obtained from spatial analysis will be corroborated from stakeholder consultations. The rivers, Mugu, Karnali and Babai encompasses more than one district and the new administrative and political boundary as per the federal structure in districts will be considered.Following stakeholders will be key to interact with. The list will be finalized based on discussion with MoF and MoAD. These will be one to one interactions. * ADAPT Nepal and FAO counterpart of NAP Agriculture Project
* Ministry of Forest and Soil Conservation (MoFSC),
* Ministry of Federal Affairs and Local Development (MoFALD),
* Ministry of Irrigation,
* Department of Water Induced Disaster Management (DWIDM),
* Ministry of Population and Environment (MoPE),
* Department of Soil Conservation and Watershed Management (DSCWM)
* District Soil Conservation Offices (in 3 districts)
* District Agriculture Development Office (DADO) of the 3 districts
* Agriculture Information Management System
* Department of Agriculture
* NGOs – e.g., SAPPROS

Based on inputs collected from spatial analysis and stakeholder consultations, one watershed per district will be selected for further study.  | Consultation meetings  |  |
| 3 | Design of vulnerability and risk assessment; and environment and social safeguard and gender assessment tools/methods | IPCC AR 5 NAP based spatial analysis  | We will use below mentioned parameters at the watershed level to assess climate change risks and vulnerability:* Ecosystem services and users of the services
* Hazard – e.g., extreme rainfall, landslides, drought etc.
* Exposure (exposed cultivated area, forest area, water bodies )
* Sensitivity (impacts of climate change - water availability, food security, biodiversity etc.)
* Adaptive Capacity (Assets and coping mechanisms to combat with climate change- irrigation facility, financial capacity, road infrastructure etc.)

The data will be acquired from available authentic literatures and GIS databases from sources such as International Centre for Integrated Mountain Development (ICIMOD), Department of Hydrology and Meteorology (DHM), Central Bureau of Statistics (CBS), District Agriculture Development Office (DADO), National Planning Commission, Ministry of Forest and Soil Conservation (MoFSC), Ministry of Federal Affairs and Local Development (MoFALD), Ministry of Irrigation, Department of Water Induced Disaster Management (DWIDM), Ministry of Population and Environment (MoPE), Department of Soil Conservation and Watershed Management (DSCWM), Ministry of Home Affairs (MoHA), Nepal Nutritional and Food Security Portal, Department of Local Infrastructure Development and Agricultural Roads | Methodology Report  | * One common CC – V/R assessment tool in line with IPCC – AR5, may be developed that would be used by two parallel studies to ensure consistency of results.
* The indicators to be chosen for analysis may be agreed upon depending on the availability of the data
 |
| 4 | Field work for the detailed vulnerability and impact assessment including environmental & social safeguard and gender assessment  | Validation of findings from spatial analysis from field visits  | Findings from spatial analysis will be validated from the field visits to the selected watersheds of the 3 districts. We will carry out *1 visit per district.* We will apply participatory methods such as focused group discussions (with local community), one to one consultations (with NGOs and local authorities) to carry out the assessments. Outcome of step #3 and #4 will be a set of possible options for EbA in the selected watersheds.  | Field work progress report | * Field visits to generate primary data and validate spatial analysis findings can be conducted in coordination.
* This will ensure that the local authorities does not have to share the same information twice and time taken to travel to the remote locations is utilized optimally.
 |
| 5 | Develop methodology/tool for applied economic evaluation of ecosystem support services and investment appraisal of agriculture adaptation practices | Desk review of existing methodologies | We will review available national and international guidelines and frameworks on ecosystem evaluation techniques. Basis the review, we will develop methodological system / framework for – a) economic evaluation of ecosystem support services, and b) investment appraisal of identified EbA practices c) assessment of climate relevance of the identified EbA measures We will make use of the Cost Benefit Assessment (CBA) methodology developed under the just completed assignment in the mountain ecosystems of Nepal. It will be suitably customized to include features of agro-ecological zones.Based on the literature review of existing tools/ methodologies the references or sources will be provided in the footnotes as applicable to justify the tools developed. | Methodology report1 Consultation and1 Validation workshop |  |
| 6 | Feasibility assessment of adaptation and mitigation measures  | Analysis of inputs received from field work and desk review  | Based on inputs from step # 3 and # 4, the identified EbA options will be prioritized based on:* Results of E&S safeguard and gender assessments (adverse impacts if any)
* Scalability and sustainability of the measures
* Climate change relevance – i.e. adaptation/ mitigation benefits of the projects as a percentage of developmental benefits
 | Feasibility assessment report | It is to be seen that the two studies come up with consistent set of potential EbA options with justification. This may be done through a face to face meeting where the two teams discuss the field findings and agree upon a common set of initiatives.  |
| 7 | Appraising cost of options  | Application of the methodology selected in step #5 to assess the cost –benefits of adaptation and mitigation options chosen in step#6.  | While applying the selected methodology to assess the cost-benefits of the prioritized options, it will be kept in mind that obtaining data required for an accurate analysis may be time consuming and expensive. Keeping the project timeline in mind, we will :1. Use market prices of interventions from authentic public domain references to assess the cost of EbA measures and apply suitable adjustments to the market prices to best estimate the cost of labour in a particular region
2. Estimate average “avoided costs” that would have been incurred in “without measure” scenario (e.g. loss of crop from pest infestation) based on information collected from local authorities such as district forest office, agricultural office on increased trends of weed growth, biodiversity loss etc.

We will also identify which costs are material and which are insignificant to the overall cost of measures. For costs that are insignificant or difficult to quantify (e.g. avoided public health expenditure), we will describe the cost head but not quantify them.  | Progress report  |  |
| 8 | Consultation  | 1 consultation workshop  | We will conduct *1 consultation workshop of one day* at the national level where relevant stakeholders from Ministries and Departments will be invited. In the workshop we will share and validate economic valuation of ecosystem services and present the cost benefits of the prioritized options, the references used and the assumptions considered and seek their feedback on practicability of the costs and assumptions considered and the viability of the cost effective options (as per the analysis).The venue of the consultation will be chosen in consultation with UNDP, MoF and MoAD in a manner that all intended participants can attend the workshop. Based on the inputs received we will finalise the cost benefits of the options.  | 1 Consultation workshop at national level |  |
| 9 | Design of Investment and Logical Framework  | Development of the logic and investment framework incorporating “Theory of Change” and in line with GCF criteria  | We will stick to GCF’s logic framework, investment criteria and the “Theory of Change”. We will develop a framework for each of the selected/prioritized EbA options that will describe how each activity produces specific outputs that lead to long term outcomes. It will also depict how the outcomes directly contribute to the overarching objective of GCF towards climate change adaptation. We will ensure that the outputs and outcomes are supported with a set of measurable, verifiable and reportable indicators. In line with GCF’s investment guidelines, we will highlight the institutional capacity required and available, financing needs, financing sources available (including PPP), for implementation of the selected/prioritized options.  | Approach Paper1 Consultation workshop1 Sharing workshop |  |
| 10 | Integrate climate change economic appraisal criteria into internal MoAD/MoLD project preparation guideline | Review of existing processes and consultation with the relevant stakeholders | We will review the existing internal MoAD / MoLD project preparation guideline and carry out a gap assessment in current process from the perspective of integrating the climate change economic appraisal criteria. We will hold one to one discussion with some of the key officials of MoAD/MoLD for in depth understanding of the current program design. Basis this initial review, we will develop a draft stock taking report which will be validated and finalized through consultation meetings at national, regional and districts level. *We will carry out 5 consultation meetings* – 1 national, 1 regional and 3 at the district level. Our approach towards the integration will be shared and the feedback received will be incorporated to develop an assessment report after consultation with the project team. We will also develop a brief policy memorandum highlighting the changes required for incorporating the climate change economic appraisal criteria into the existing guideline. The inputs received during consultation will also be used while preparing handbook / internal guidelines for MoAD/MoLD officials.The venue of the consultation will be chosen in consultation with UNDP, MoF and MoAD in a manner that all intended participants can attend the workshop.*We will also apply our learnings in terms of investment policy gaps from consultations with policy makers as a part of the recently completed assignment for mountain ecosystems.*  | Stock taking and assessment report; Policy memorandum5 consultation meetings – 1 national, 1 regional and at the district level  |  |
| 11 | Develop hand book materials, training module and conduct training to national and sub national actors | 2 Training Workshops (1 sub national and 1 national) | We will develop a training module in coordination with FAO based on the agenda of the workshop and original learnings from the study undertaken as a part of this assignment. We will conduct *FOUR training workshops* - ONE at national level (of 2 days’ duration)) and THREE at sub-national/ district levels (each of 1 day duration) conducted in local language (Nepalese).The training will be intended for the implementing agencies and NGOs (for service delivery) who will implement the EbA measures and monitor progress and outcomes of the measures. Sub-national training will be intended towards district level agriculture officers, forest officers, representative of district and village development committees and NGOs working in the area of the selected watershed. The national training will be intended towards representatives of national level implementing agencies such as MoAD, MoLD, Ministry of Population and Environment (MoPE), MoFSC, MoFALD and national level NGOs. Each workshop will be designed to address 25-30 participants.The training programme will contain the following:* + Introduction to the impacted area, the problem
	+ Description of the suggested EbA options for the stated problem
	+ Description of alternatives to the suggested EbA options – intervention, technology
	+ Description of “with measure” and “without measure” scenarios – the costs, losses and benefits
	+ How costs are calculated and the assumptions considered
	+ Worked out examples
	+ Interactive session – questions and answers

Finally based on the feedback received during these two workshops, previous consultations and outputs of other studies carried out as a part of this engagement, we will prepare a handbook/internal guidelines for relevant ministries officials with a focus on MoAD and relevant agricultural planning and budget officers at local level in the target districts. This handbook will cover guidance to improve economic appraisal of programs by incorporating climate change costs & benefit of priority climate change practices. We will work closely with FAO while preparing the handbook/internal guidelines. | Handbook / Internal guidelines  |  |
| 12 | Sharing of Investment and logic Framework  | 1 sharing workshop  | We will conduct one consultation workshop of half a day duration specifically for the line agencies, service provides (e.g. NGOs) and community groups at the national level. Each workshop will be designed to address 25-30 participants. The agenda will contain the following:* + Presentation on the investment and logic framework of EbA measures prepared in step # 9 describing the activities, outputs, outcomes and impact of the selected EbA measures
	+ Discussion on possible roles and responsibilities of the line agencies
	+ Feedback from each line agency on the feasibility of framework, their roles
	+ Interactive session- Questions and Answers

The venue, in consultation with UNDP, MoAD and MoF, will be chosen in such a manner that all intended participants can attend the workshop. | Completion of 1 consultation workshop  |  |
| 13 | Revised and final report | Report preparation and revision  | We will finalise the project report incorporating all comments, recommendations received from all consultation workshops, UNDP project team, FAO, MoAD and MoF. The final report will contain: * Key inputs from all progress reports
* Methodologies
* Tools
* Presentations
* Minutes of all consultation meetings and workshops prepared from Step # 1 to Step # 11
* It will contain an executive summary to start with and a way forward in the end.
 | Final report |  |

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### P***rotocol for information sharing with FAO/ADAPT Nepal***

Data and information with FAO/ADAPT Nepal will always be shared by PwC through UNDP. UNDP will review PwC’s deliverables and share the same with FAO/ADAPT Nepal as they deem appropriate. Similarly any report prepared by FAO/ADAPT Nepal as a part of the on-going work may be shared with PwC through UNDP. Face to face meetings between PwC and ADAPT Nepal may be organized by UNDP /FAO once in every 15 days till the EbA options are finalized.

Also it is to be noted that PwC’s analysis will differ from that of ADAPT Nepal's though both will use the same data source. PwC will consider watershed scale and will analyse data of all districts covered by one watershed (i.e. watershed boundary may go beyond the spatial/political boundary of the three districts considered under the scope of work) whereas ADAPT Nepal's analysis will be restricted to the three districts. Consequently, the rationalization methodology and the ultimate outcomes of the two studies may not be comparable. These differences need to be looked at from a climate change lens while selecting and prioritizing the EbA options.

## Timelines

The key activities will be carried out and deliverables will be submitted to UNDP according to the following schedule

|  |  |
| --- | --- |
| **Activity** | **Days** |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 |
| Inception meeting  | **D1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Identification of vulnerable agro-ecological zone(watershed) |  | **D2** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Design of vulnerability and risk assessment tool and environment and social safeguard and gender assessment tools/methods |  |  | **D3** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Field work for the detailed vulnerability and impact assessment including environmental & social safeguard and gender assessment |  |  |  |  |  | **D4** |  |  |  |  |  |  |  |  |  |  |  |  |
| Develop methodology/tool for applied economic evaluation of ecosystem support services and investment appraisal of agriculture adaptation practices |  |  |  |  | **D5** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Feasibility assessment of EbA measures |  |  |  |  |  |  | **D6** |  |  |  |  |  |  |  |  |  |  |  |
| Appraising cost of options  |  |  |  |  |  |  |  |  | **D7** |  |  |  |  |  |  |  |  |  |
| Conducting a consultation at national level |  |  |  |  |  |  |  |  |  | **D8** |  |  |  |  |  |  |  |  |  |
| Design of Investment and Logical Framework |  |  |  |  |  |  |  |  |  |  |  |  | **D9** |  |  |  |  |  |  |
| Integrate climate change economic appraisal criteria into internal MoAD/MoLD project preparation guideline |  |  |  |  |  |  |  |  |  |  |  |  |  | **D10** |  |  |  |  |  |
| Develop hand book materials, training module and conduct training to national and sub national actors |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **D11** | **D12** |  |
| Sharing of Investment and logic Framework |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Revised and final report |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **D13** |

| **Date of Submission** | **Deliverables** | **Quality Assurance criteria (contents, tools, refrerences etc)\*** |
| --- | --- | --- |
| **D1 (6th August 2017)** | Inception Report | This will contain the following:1. Executive Summary
2. Objective of the assignment
3. Scope of work
4. Methodology to be followed
5. Timelines of deliverables

Methodology and workplan are drafted in line with the Terms of Reference of the contract.  |
| D2 (19th August 2017) | Criteria Method Report and 2 consultation meetings | This will contain the selection criteria of the watersheds in the 3 selcetd districts in terms of:1. Indicators analysed
2. Data sources
3. Screening and ranking methodology
4. Results of spatial analysis – scroes and maps ((Arc GiS/Q-GS will be used as tools)

This report will enable selection of the most vulnerable watersheds in the 3 districts. |
| D3 (24th August 2017) | Methodological Paper on assessment of vulnerability and risk, , environment, social and gender  | The report will conntain:1. Introduction
2. Methodology for risk and vulnerability assessment in line with IPCC AR5 definition
3. List of indicators consiered for assessment of sensitivity, adaptive capacity, hazard and exposure
4. Data sources
5. Tools to be used for spatial analysis (Arc GiS/Q-GS will be used as tools)
6. Methodology for validation of spatial analysos from filed visits
7. Methodology for environment, social and gender assessment
 |
| D4 (15th September 2017) | Progress Report on the field work | The report will contain the following:1. Introduction
2. Methodology of field work
3. Findings from field work
	1. Demography, socio-economic conditions
	2. Ecosystem parameters and changes
	3. Hazard hotspots
	4. Validation of spatial analysis
4. Probable adaptation measures
5. Next steps /way forward
6. Annexes
	1. Field assessment schedule
	2. Findings of vulnerability and risk assessment
	3. Local price of agri-products and other details
	4. Meeting records
	5. FGD Questionnaire
 |
| **D5 (15th September 2017)** | Methodological Paper on economic valuation of ecosystem support services and investment appraisal tools | The report will contain the methodology for Cost Benefit Analysis (CBA) of probable EbA measures based on review of internationally proven methodlogical guiedelines.   |
| D6 (8th October 2017) | Progress Report on the feasibility assessment | The report will contain the following:1. Introduction
2. Spatial analysis
3. Field visit summary
4. Description of EbA options
5. Findings of E&S and gender assessment s
6. Prioritisation of EbA options
7. Annexures – maps, meeting records

  |
| D7 (25th October 2017) | Report on cost benefit analysis | The report will contain:1. Introduction to priortised EbA meausres
2. Findings of CBA for the prioritised EbA options
3. list of assumptions
4. data sources, list of references
 |
| **D8 (31st October 2017)** | 1 Consultation workshop at the national level to validate economic valuation of ecosystem services and CBA appraisals on adaptation options | PwC will share:1. Detailed agenda of the meeting
2. Session plan of the meeting
3. Presentation on CBA
4. Revisions on CBA (if any) based on the feedback from the consultation meetings
 |
| D9 (20th November 2017) | Approach paper on investment and logical framework | The report wll contain:1. Executive summary
2. About Green Climate Fund
	1. The six investment criteria of GCF
	2. Theory of Change
	3. Logical framework
3. Government of Nepal’s vision of developing projects for GCF
4. Components of a GCF proposal
5. Approach to selection and evaluation of EbA measures
6. How the interventions meet the six GCFinvestment criteria
7. Designing a strategic investment framework for financing climate actions
	1. Objectives of a strategic investment framework for climate responsive development
	2. Dimensions and strategies of an effective investment framework
8. Conclusion
9. References
 |
| D10 (1st December 2017) | Stock taking and assessment report; policy memorandum, consultation meetings – 1 national, 1 regional and 3 at the districts level | PwC will share:1. Detailed agenda of the meetings
2. Session plan of the meetings
3. Presentations
4. Meeting records
 |
| **D11 (15th December 2017)** | Training module and presentation slides | We will make the sure that the training module is user friendly and written in a language understable by non-technical readers as well. The presentation will capture all gradients of the training module in brief. The training module will contain the following.1. Preface
2. Guidance on the manual
3. About climate change and GCF
	1. Impacts of climate change in Nepal
	2. Need for EbA
	3. Financing EbA
	4. Role of GCF
	5. Investment plan for GCF
4. Assessment of vulnerability
	1. Steps/ techniques for vulnerability and risk assessment
	2. Illustration of vulnerability and risk assessment
	3. Illustration of spatial analysis
	4. Illustration of field findings
5. Steps for identification of potential EbA measures with illustration
6. Illustrative description of identified measures
7. Steps for prioritization of the identified measures with illustration
8. Cost Benefit Analysis –
	1. General Methodology
	2. Climate Change relevance of a project
	3. Illustration of CBAs with and without climate benefits
	4. Findings from consultations
	5. Requirements of reforms and institutional mechanisms
9. Preparing the investment plan
	1. Sections of investment proposal
	2. Linkages with background work
10. References
 |
| D12 (16th January 2018) | Internal guidelines / handbook | Based on the feedback obtained from UNDP/MoF/FAO/MoAD on the training module an internal handbook will be prepared . The content will be in line with the training module.  |
| **D13 (30th January 2018)** | Final report | Final report will be a compliation of all previous report and it will contain:1. Acronyms
2. Preface
3. Executive Summary
4. Introduction
	1. Impacts of climate change in Nepal
	2. Need for EbA
	3. Financing EbA
	4. Role of GCF
	5. Investment plan for GCF
5. Assessment of vulnerability and risk
	1. Vulnerability and risk assessment framework
	2. Methodology and selection of the most vulnerable watersheds
		1. Spatial analysis of watershed
6. Field Assessment
	1. Site selection for the field visits
	2. Field assessment methodology
	3. Participants
	4. Findings from field visits
	5. Validation of spatial analysis
7. Climate Change Scenario Analysis
8. Identification of adaptation measures
	1. Overall approach towards selection of adaptation measures
	2. Logical framework for mapping of adaptation measures
		1. Description of measures
9. Feasibility Assessment of Adaptation measures
	1. Environmental & Social assessment
	2. Gender assessment
	3. Prioritization of identified measures
10. Cost Benefit Analysis
	1. CBA methodology
	2. Appraising cost of options
11. Investment and Logic framework
	1. The six investment criteria of GCF
	2. Theory of Change
	3. Logical framework
	4. Objectives of a strategic investment framework for climate responsive development
	5. Dimensions and strategies of the investment framework
12. Annexure
	1. Meeting records
	2. Spatial analysis – all maps
	3. GCF investment criteria for the proposed EbA measures
 |

\* For all deliverables under the assignment, the following steps will be followed to ensure quality:

**Language and formatting** – We will adhere to the PwC report writing guidelines for client deliverables. The guidelines have been published by PwC Corporate Communications Team and some key pointers from the same are as follows:

* Simpler - Avoid use of unnecessary jargons and use simpler language.
* Shorter - Writing to be specific, by avoiding empty words and assertions; justify with facts and numbers
* Clearer - Writing with a purpose, conveying the relevant and important meaning to the reader

The report formatting will follow the PwC branding guidelines in terms of the colour schemes, text fonts, use of pictures and other formatting elements.

**Review mechanism** - We will have a tiered review process, 1st level review by the Team Leader, 2nd level review by the project manager, 3rd level review and report finalization by the project partner.

**On-site resource for arrangement and coordination of field visits, consultation meetings and workshops** – one resource from PwC India will be present in person a week before any event to supervise, coordinate activities and troubleshoot issues if any.

# Glossary

* **Climate:** Climate of an area or country is known as the average weather over a long period of time. It refers to the characteristic condition of the atmosphere deduced from repeated observations over a long period. More than a statistical average, climate is an aggregate of environmental conditions involving heat, moisture and motion. Climate studies must consider extremes in addition to means, trends, fluctuation, probabilities and their variations in time and space. Full potential of climate in agricultural resource has not been used or very often realized. It is inevitable to make adjustment with the weather to extract the maximum benefit from this resource. In this context, knowledge on agro-climatology of a region is a valuable tool in crop planning and Management.
* **Agro-ecological zones (AEZs):** It is a geographical areas exhibiting similar climatic conditions that determine their ability to support rained agriculture. At a regional scale, AEZs are influenced by latitude, elevation, and temperature, as well as seasonality, and rainfall amounts and distribution during the growing season. The orientation of mountain ranges, deep valleys, slopes and aspects are major factors creating a number of micro-climatic regimes within short distances from south to north. The summer monsoon is the most important influence on climatic variation, and consequently the country as a whole is characterized by four distinct seasons: winter (December to February), spring (March to May), summer (June to September) and autumn (October to November).

At the highest level of aggregation, nine agro-ecological zones were distinguished from the FAO agro-ecological zones (FAO-AEZ) land inventory. These include:

1. Warm arid and semi-arid tropics
2. Warm sub-humid tropics
3. Warm humid tropics
4. Cool tropics
5. Warm arid and semi-arid subtropics with summer rainfall
6. Warm sub-humid subtropics with summer rainfall
7. Warm/cool humid subtropics with summer rainfall
8. Cool subtropics with summer rainfall
9. Cool subtropics with winter rainfall

The FAO-AEZ classification is based on rainfed soil moisture availability in terms of reference length of growing period (LGP) derived using a water balance model, and temperature conditions during the LGP.

* **Watershed:** A watershed is the area of land where all of the water that falls in it and drains off of it goes to a common outlet. Watersheds can be as small as a footprint or large enough to encompass all the land that drains water into rivers that drain into Bay, where it enters the Atlantic Ocean. The watershed consists of surface water--lakes, streams, reservoirs, and wetlands--and all the underlying ground water. Larger watersheds contain many smaller watersheds. It all depends on the outflow point; all of the land that drains water to the outflow point is the watershed for that outflow location. Watersheds are important because the streamflow and the water quality of a river are affected by things, human-induced or not, happening in the land area "above" the river-outflow point.

# References

Ahmed, M. a. (2014). *Assessing the Costs of Climate Change and Adaptation in South Asia. ADB and UK Aid.*

Andrade, A., Córdoba, R., Dave, R., Girot, P., Herrera-F., B., Munroe, R., . . . Suarez. (2012). *Principles and Guidelines for Integrating Ecosystem-based Approaches to Adaptation in Project and Policy Design.* Turrialba, Costa Rica. 4p: IUCN- CEM, CATIE.

(n.d.). *Best Practices on Planning, Implementing and Monitoring & Evaluating Ecosystem-based Adaptation to climate change.* GIZ.