

Royal Government of Bhutan, Ministry of Agriculture and Forests
Department of Forests and Park Services,
Watershed Management Division (REDD+ Secretariat)

Terms of References for Valuation of (Forest) Ecosystems Services

I. Context

Bhutan has 72.46 percent of the total area under forest cover and 51.32 percent, managed as protected areas and biological corridors. It is home to a diverse array of flora and fauna, serving not only as rich repositories of biodiversity but stores of carbon, which mitigate the adverse impacts of climate change. The protected areas encompass a representative continuum of all major ecosystems ranging from the sub-tropical forests in the southern foothills and the temperate forests in the central mountains and valleys to alpine meadows in the northern high mountains. Furthermore, the extensive river systems, fed by high precipitation, glaciers and lakes, provide benefits such as water and other ecosystem services (ES) to both upstream and downstream stakeholders.

Forests offer a wide array of benefits ranging from reduction of sedimentation in catchment areas of hydropower plants that would otherwise affect equipment and optimum supply of energy, to timber, food, fuel wood, fodder and medicine to drinking and irrigation water and carbon sequestration. These benefits vary depending on forest environmental conditions such as forest type, quality and productivity and in many cases the socio-economic circumstances of the forest dependent communities. Forests located in community watersheds/catchments provide vital ecosystem services such as soil conservation, drinking and irrigation water and recreation sites for downstream farmers and cities.

Recognizing the importance of forests in providing goods and services, an agreement can be made between downstream users (the service buyers) and upstream communities (providers) detailing service use fee payment for protection, management and conservation of forests under the payment for environmental (or ecosystem) services (PES) mechanism. PES schemes continue to emerge as an innovative mechanism to provide incentives for sustainable ecosystem management (UNDP, 2009). PES takes various shapes and models all demonstrating "...an economic incentive to land managers to adopt land use or management practices favorable to the protection of ecosystem services" (Perrot-Maitre, D., 2006). Unlike the traditional subsidy where taxpayers pay for the service, here the beneficiaries of the ecosystem services are the ones who will pay for the services rendered for maintaining the targeted ecosystem services (Perrot-Maitre, D., 2006).

Examples from various PES show that it covers a diverse number of mechanisms that range from "voluntary compensation schemes for forest maintenance or agro-silvopastoral practices in Central America, to non-voluntary compensation for reforestation in China and Vietnam, trading schemes in Australia and the United States, and sometimes agro-environmental subsidies and certification schemes in the European Union and the United States" (Perrot-Maitre, D. (2006) to voluntary payments for keeping demarcated watersheds off limits for farming and other extractive purposes in Brazil, etc. In terms of geographic scale, the scheme could range from micro-watersheds such as proposed for the Chukha district in Bhutan to entire watersheds that could transcend political boundaries.

While results from the various PES-type mechanisms have been varied from the highly celebrated results in Costa Rica to fledgling operations in Bhutan, studies show that "establishing PES could be a very complex undertaking, one that requires the consideration of scientific but also social, economic, political, institutional, and power relationships" (Perrot-Maitre, D. (2006). The complexity is usually as a result of (a) paucity of data on the priority respective ecosystem services in terms of the baselines, of the change factors that determine the optimum quality of the targeted ecosystem service, and the economic valuation;

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(ii) working understanding of the buyer/payer-supplier relationships; (iii) weak institutional structures for designing including guiding the contractual process for setting a negotiated price and payment arrangement, and monitoring; and (iv) a grievance and redress mechanism to address any buyer-payer and broader stakeholder complaints. Without reliable baseline data and scientifically based economic value of ecosystem services, the design of the PES model could be flawed and in the bigger realm of policy and decision making, affect allocation of resources for optimum management of critical natural resources such as forests, watersheds and catchment areas.

When the values/benefits, both tangible intangible, accruable from forest ecosystems are properly valued using tested methodologies and techniques, it informs decisions and subsequently adoption of appropriate policies and allocation of finances for sustainable forest and land management practices. However, often than not, decision makers are not fully aware of all the services provided by forest ecosystems nor their worth in economic or financial terms resulting in a number of policy and market failures that lead to forest degradation and loss.

To date, no attempt has been made to systematically value the services provided by forests in Bhutan. The National Biodiversity Strategy Action Plan (draft July 2014) highlights that, “even the critical watersheds supplying clean and abundant water for the generation of hydropower, a major driver of economic growth and a revenue generator in the country has been overlooked. Recognizing this, the government has taken recent initiatives to establish Gross National Happiness Accounts, covering ecological capital, cultural capital, human capital, social capital and economic capital (RGOB 11th FYP). However, these efforts are still at a very nascent stage given the limited capacities in terms of technical, financial and human resources in the country and the lack of an institutional mechanism to coordinate and lead programs for valuation of biodiversity and ecosystem services”. Within the context of the FCPF REDD+ Readiness, the Royal Government of Bhutan intends to develop market based incentive mechanism for promoting efficient and inclusive forest ecosystems management, and carbon sequestration that is sustainable and attractive to a range of beneficiaries that depend on forests – a mechanism that suggests a PES-type scheme. The government is also looking into carrying out a National Green Capital Accounting that would encompass Forest Accounting aimed at establishing a baseline and the contribution of the forest sector to the national economy and people’s livelihoods.

In Bhutan, a number of PES-type mechanisms that are currently functioning have the potential to be scaled up in other parts of the country or nationwide taking into account lessons and experiences generated to date in the country, and from international experience. A comprehensive synthesis of these mechanisms will be valuable for scaling up and could also be offered as models that could potentially be replicated in other parts of the sub-region or globally. The output from this work would enhance Bhutan’s PES initiative and tag values to forest ecosystem services. This would contribute to responding to challenges with “synergizing rapid socio-economic development with the Government’s conservation efforts to uphold the constitutional mandate of maintaining 60 percent of the land under forest cover”.

The following TORs is therefore to contract an international Consultant to carry out the following tasks in two phases over a period of 14 months. The first phase of activities will primarily involve establishing the baselines of forest ecosystem services and understanding their potential contribution to the national economy and livelihoods. The second phase which will be initiated simultaneously with phase one will

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involve developing a case study for a PES scheme for the role of forests in reduction of soil erosion and river sedimentation and hydropower production and explore fund mobilization for PES.

II. a. Summary of Tasks – Phase 1

The purpose of this consultancy work is to help understand the forest ecosystem services and the economic value provided by different ecosystems and forest types in Bhutan with specific objective to understand the value the forest sector generate in economic and development terms. The other objective of study is to support scaling up and expansion of PES schemes in Bhutan in a process that involves establishing working baseline values for priority forest ecosystem services, synthesizing existing PES schemes taking into consideration local and international experience and recommending policy guidance for PES. The consultancy will also produce the baseline and policy recommendations for establishing PES schemes on potential environmental services within the context of the Bhutan.

The tasks would involve

- Comprehensive review of the synthesis report on existing PES schemes in Bhutan identifying and completing data gaps into a robust background report on PES;
- valuation of forest ecosystem services and goods;
- and identify scope for scaling up existing emerging PES schemes to other ecosystem services
- gather international experience in PES schemes through an international workshop;
- provide technical guidance for a study tour to select PES countries that have similar economic values from their forests
- provide training and capacity development on valuation of ecosystem services and PES for key government agencies and stakeholders introducing the concept of national capital accounting

b. Summary of Tasks – Phase 2

- building on the comprehensive synthesis of existing PES-type schemes in Bhutan and on relevant global PES best practices, produce a case study establishing the baseline and policy recommendations for a PES scheme for the Bhutan Sustainable Hydropower policy that has a provision to support environmental services. The Consultant will use available tools including the DRUK DIF (<http://www.drukdif.ocean.washington.edu/>)

III. Detailed Description of Tasks – Phase 1

- a. **PES Synthesis Report:** The Consultant will review and complete data/information gaps in the synthesis report prepared by the Watershed Management Division (WMD), Department of Forest and Park Services, MOAF on existing (including pipelined) PES in Bhutan. This will involve literature review and consultations to (i) identify forest ecosystem services, their baselines, the change factors that determine the optimum quality of the targeted ecosystem service, and the economic valuation; (ii) provide a working understanding of the buyer/payer-supplier relationships; (iii) understand the systems or institutional structure has been set up for designing the scheme, supporting the contractual process for setting up a negotiated price and payment arrangement, and for monitoring the scheme; and (iv) outline the grievance and redress mechanism for addressing

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any buyer-payer and broader stakeholder complaints. The synthesis will identify any applicable policies and regulations guiding the existing PES schemes in the country. Key references will include the *Payment for Environmental Services Framework for Bhutan* and the *Payment for Environmental Services Field Guide for Bhutan*. The output will be a background on existing PES schemes in Bhutan. The Consultant will support this activity including reviewing and editing the final background paper.

- b. **International PES workshop:** To glean global best practices that are relevant in the Bhutan context, provide technical support for an international technical workshop in Thimphu that will convene select international experts on PES who can inform innovation in and scaling up of PES schemes in Bhutan. The international PES workshop will bring together key international PES experts on the various elements of designing and sustainably implementing a PES scheme highlighting institutional arrangements, sustained financing for the scheme, valuation methodologies of forest ecosystem services, and approaches for scaling up and mainstreaming PES scheme into national level development policies and programs. During the workshop, the key findings and messages from the synthesis exercise will be presented.
- c. **Valuation of Forest Ecosystem Services:** Using secondary data and primary data to be collated, proven methodologies and models, the Consultancy would determine forest ecosystem services (ES) and their economic values using proven methodologies. This sub-task will supply baseline data and projected growth trends outlining the approach for conducting periodic updates to baseline data and growth/change trends. The consultant will liaise with the consultancy on the Drivers of Deforestation and Degradation in determining the growth/change trends. Targeted ES will include but not limited to
- the carbon sequestration/mitigation capacity and its potential value;
 - value forest ecosystem services for regulating the quality and quantity of water including for recharging aquifers and sustaining water supply;
 - forest value in sediment reduction and erosion control potential in watersheds and catchment areas;
 - the forest value for protecting arable soils, agriculture farm land;
 - the recreational, cultural and biodiversity values;
 - the value of timber and Non-wood Forest Products (NWFP)s including medicinal values; and
 - the value of forest to pasture/livestock production

In identifying and quantifying ES, the Consultant will consider the following

- Temporal and spatial scales at which the ES are produced, as well as the linkages between different ES, to identify landscape zones with high ES potential
- An understanding of the impact of land-cover and land-use patterns, soil conditions, hydrological cycles, etc. on the production and flow of ES
- Establish dynamic baseline levels and indicators of the supply of the ES in question
- Determine practical incremental steps – both preventive and restorative, to increase the supply of ES and indicators for monitoring the same

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- Indicators that can be used to monitor the delivery of specific ES
- Assess gaps in current understanding and measurement, and devise a strategy to address these gaps

As part of this sub- task, the Consultant will outline any data gaps as it pertains to comprehensive valuation and accounting of the value of forests and their contribution to the national economy and people's livelihoods; and reflect the full range of goods and services associated with the forest sector which will be key to enhancing long-term sustainable financing for improved management of forests.

d. **Training & Capacity Building:**

Given the limited local expertise in forest resources valuation, the consultancy will strengthen the national capacities in the areas of forest ecosystem valuation and PES mechanism. It is anticipated that multidisciplinary team of national officials from relevant agencies will be trained on both these aspects through both on the job and formal training.

- e. **Study tour:** The study tour exchange is expected to expose to and provide hands on experience with managing PES programs. The consultant will work with the client with advice from the Bank in selecting two countries with best practice PES programs and **provide technical support** and guidance for the study tour. For the study tour, the consultant will be supported by the local consultant and project management unit. The key players including key government agencies particularly the policy makers, private sector, potential local community beneficiaries, will participate in the study tour.

Phase two will be a continuation of the phase 1 activities with focus on the forest-hydropower nexus.

IV. Detailed Description of Tasks - Phase 2: Case Study

- f. **Case study on PES scheme for hydropower-forest catchment:** build on the comprehensive synthesis of existing PES-type schemes in Bhutan and on relevant global best practices, develop policy and operational recommendations for PES-type system for the Bhutan Sustainable Hydropower Development Policy that has a provision to support environmental services. This sub-task will respond to the observation that hydropower is seen "as one of the potential sectors for applying PES mechanism to manage watersheds through regulated flow and reduced sedimentation"¹. The consultant would do a **case study** to value the sediment retention for hydropower for one select catchment and elaborate on a market based buyer-service provider relationship for cost effectively managing sediments through various interventions in the upper catchments. The Consultant will
 - i. assess the physical service of sediment retention using hydrological model(s); establish, using new and available data, proven methodologies and models, *the forest- hydropower nexus*. The Consultant will apply tested models to show the role and contribution of forests

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- and other land uses in the catchment area to reducing sedimentation thereby establishing the relationship between land use / land cover and sediment production in the catchment
- ii. review policies, regulations and development plans governing forests and watersheds, land use and hydropower sector and identify policy space for improving forest contribution to hydropower productivity in Bhutan
 - iii. carry out a comprehensive map out of the beneficiaries, buyers and service providers in the target catchment area
 - iv. carry out consultations with different stakeholders in efforts to understand the concerns and interests of diverse stakeholders (guidance from the HP PES policy framework).
 - v. identify the institutional arrangements that are necessary for the PES on hydropower sector. Key institutions will include the MoF, NEC, MoEA and DGPC, Dzongkhag Administrations governments, NGOs and CBOs (eg. CFMG, FG, WUA), and private sector. The mapping will identify specific roles/stake/input and relevant risk issues.
 - vi. As basis for establishing the pay rate for unit reduction in sedimentation, apply proven models (such as RIOS² and SWAT), available primary and secondary data to help identify a portfolio of investments to increase sediment retention in the catchment.
 - vii. Using international benefit sharing and PES-type schemes and the Bhutan PES Field Guide, identify a process for the payment agreement, establish the payment options, benefit distribution system, approach for reducing transaction costs, resource management and M&E system, safeguard management, grievance redress and establish a verification and protocol team.
 - viii. In determining the types and levels of payments, the Consultant will consider the following³:
 - (a) Payments can be for outcomes, outputs, inputs, or a combination thereof.
 - (b) may be in cash or kind or a combination thereof.
 - (c) payments in all cases (whether community driven or individual) would be coordinated/ regulated through community groups operating in the area.
 - (d) Payments would typically be made on the basis of agreements that may include the management steps, the basis for the payment, time-frame, monitoring requirements etc.
 - ix. Develop and administer a capacity development training package for the GNHC, NEC, MoEA, DGPC and other relevant departments in the application of key tools and sustainable management of the PES system.
- g. **PES fund mobilization**: Lead the REDD+ funds mobilization sub-task pertaining to PES. Determine through a consultative process, avenues for generating additional resources from public or private sources including corporate social responsibility funds for PES in REDD+. The Consultant will identify appropriate economic instruments, such as environment cess, green tax, voluntary payments, mitigation payments etc. for improving the financial basis of PES and creating

³ guidance from the Himachal Pradesh PES Policy Note

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a larger financial pool, while also attempting to reduce transaction costs and minimize overheads. The outputs under this sub-task will feed into the overall REDD+ fund mobilization exercise which is to identify, map out, and clearly define the sources and process for applying for REDD+ funding to implement the REDD+ activities to be identified in the Bhutan REDD+ National Strategy and Action.

V. Work Planning & Implementation

To ensure an inclusive and consultative process, develop and implement a consultation work plan which may comprise (i) an inception workshop to discuss methodology for implementing this consultancy, (ii) a national workshop halfway through the task to discuss findings and seek views from relevant government, CSOs and other key stakeholders, iii) a workshop at submission of first draft report, and the final report respectively etc. Consultations will ensure to create awareness, discuss the scope of the study, disseminate information and experiences on working PES schemes in Bhutan and beyond, data gaps and other relevant design and implementation requirements; and will also aim to derive the perception of stakeholders on the economic and social values of use of forest and forest ecosystems.

VI. Deliverables and Schedule

The final delivery of the consultant will include

- i. reviewed synthesis report/background report on PES schemes in Bhutan
- ii. Economic valuation baselines for forest ES and projected growth/change
- iii. capacity development training manual including feedback from the administered training and a roadmap for developing a National Capital Accounts; and
- iv. Framework on approaches, methodologies and tools for periodic valuation of targeted ES under Section III c.
- v. case study on tailored PES-type scheme for the Bhutan Sustainable Hydropower Development Policy including a fund mobilization for PES

The working person-days for the overall assignment is 14 months and is expected to be finalized within 17 months after contract signature. Phase 1 activities will be completed in 8 months and subsequently phase 2 by the 14th month.

A first progress report for phase 1 will be furnished by 4 months after contract signature; the mid-term progress report within 5.5 months from contract signature; and the final report on or by close of the contract date. While. The payment will be made as below.

VII. Payment Schedule:

Period	Product	Payment
3 weeks	Comprehensive Inception Report on phase 1 including reviewed synthesis report	20%
3 months	Progress report on valuation of Forest ES, training manual, international workshop and study tour	10%

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4 months	Draft for Consultations: Valuation report, results from training;	10%
8 months	A finalized report on phase 1	10%
Phase 2		
9 months	Comprehensive Inception report for phase 2	10%
11 months	Draft case study on PES for hydropower-forests, training manual, fund mobilization for consultations	20%
14 months	Finalized PES Case Study including fund mobilization for PES	20%

VIII. Qualifications:

The lead consultant will have an advanced degree (Master’s and/or PhD) in Natural Resources Management, Forest Economics, with at least of 15 years of experience in ES economic valuation and project management; demonstrated ability to lead a study and ability to train stakeholders on-the-job while conducting the valuation. It is expected that following skill sets will be required to fulfill the conditions of the consultancy. The lead consultant will be responsible for identifying and recruiting expertise to perform the tasks and produce the deliverables described in these Terms of Reference.

- Advanced degree in Natural Resource Economics, Environmental Economics or equivalent with at least 15 years relevant experience;
- In-depth and extensive experience in economic valuation of forest and ecosystem services including national green accounting.
- Forest carbon assessments.
- Proven experience and in-depth knowledge of PES mechanism.
- Knowledge in international carbon markets, REDD+ and voluntary carbon markets
- Proven experience in modelling of erosion from different land uses and stream sedimentation.
- Experience in scenario testing of alternative land use practices and cost benefit analysis.
- Experience in GPS and remote sensing.
- Experience in capacity building, mentoring and formal training.
- Excellent oral and written communication skills, with an ability to communicate with a wide range of audiences.
- Hydrology assessments and computer modeling of sedimentation flow.

IX. Client's Input to the Consultant:

The PES focal officer from WMD will be designated to work with the hired consultant. He/she will also supervise and oversee the contract and help to implement the study by providing feedback and coordination with other government and non-government agencies. The focal officer will also facilitate consultation meetings, workshops, field visits and interviews or discussions with the relevant stakeholders and members of the REDD+ Technical Working Groups at different stages of the study.

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X. Reporting, Supervision and Copyright:

1. The Consultant will report to the Chief Forestry Officer, WMD (REDD+ Secretariat) and the World Bank WB Task Team (dcudjoe@worldbank.org).
2. All data and documents generated from the consultancy work should be submitted to the Ministry of Agriculture and Forests (MoAF) and the ownership and copyright of the data, maps, consultation records and reports shall rest with MoAF.

XI. References:

- Perrot-Maître, D. (2006) The Vittel payments for ecosystem services: a “perfect” PES case? International Institute for Environment and Development, London, UK
- Bhutan National Biodiversity Strategy Action Plan (draft July 2014) available at <https://www.cbd.int/doc/world/bt/bt-nbsap-v4-en.pdf>
- RGOB 11th Five Year Plan available at <http://www.gnhc.gov.bt/wp-content/uploads/2011/04/Eleventh-Five-Year-Plan.pdf>