

# Designing a National PES Approach in Bhutan

## Feasibility Assessment and Proposal



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## Acronyms and glossary

CF	Community Forest
Chiog	village / hamlet
CoRRB	Council for RNR Research of Bhutan
DANIDA	Danish International Development Assistance
DoA	Department of Agriculture
DoF	Department of Forest
DoL	Department of Livestock
Dzongkhag	District
DEC	Dzongkhag Environmental Committee
DSH	Dzongkhag Sector Heads
DT	Dzongkhag Tchongdu (Dzongkhag (Development) Committee)
ES	Environmental Services
FYP	Five Year Plan
FAO	Food and Agriculture Organization of the United Nations
FS&N	Food Security & Nutrition
FEO	Forestry Extension Officer
GAO	Geog Administrative Officer
GT	Geog Tshogchung (Geog (Development) Committee)
GIS	Geographical Information Systems
GEF	Global Environment Facility
GDP	Gross Domestic Product
GNH	Gross National Happiness
Gup	administrative head of geog
HP	Hydropower
MoA	Ministry of Agriculture
M&E	monitoring and evaluation
MRV	Monitoring Reporting and Verification
MW	megawatt
MWHS	Ministry of Works and Human Settlements
NRM	Natural Resource Management
NSSC	National Soil Services Centre
NEC	National Environment Commission
SNV	Netherlands Development Organisation
NGO	Non Government Organizations
NTFP	Non-Timber Forest Products
Nu	Ngultrum
PLA	participatory learning and action (previously PRA)
PM&E	participatory monitoring and evaluation
PRA	participatory rural appraisal (now PLA)
PES	Payment for Environmental Services
PPD	Planning and Policy Division
REDD+	Reducing Emissions from Deforestation, Forest Degradation and enhancement
RNR	Renewable Natural Resources (Agriculture, Forest and Livestock)
RC	RNR Research Centre
RGoB	Royal Government of Bhutan
geog	smallest administrative area in local government, equivalent to a block in India
SLM	Sustainable Land Management (management practices that maintain, or improve, the land and land-based resources, its quality and productivity)
SLMP	Sustainable Land Management Project
TCC	Thimphu City Corporation
Tshogpa	administrative head of chiog
USD	United States dollars
WRMP	Water Resources Management Plan
WWF	Worldwide Fund for Nature

## **PART I- Project proposal**

### **Designing a national PES programme in Bhutan- *Pilot phase 2010-2015***

#### **Rational and justification**

Bhutan, a small country in the Eastern Himalayas, is characterized by a highly mountainous terrain, extensive forest, abundant rains and rivers. These natural resources are in good condition thanks to the strong conservationist policy of the Bhutanese government since the late 1960s. By law, 60% of the land area must remain under forest cover, and most of the headwaters are under dense forest cover. These conditions provide excellent opportunities for safe water supply to the population, hydropower generation and nature-based tourism development.

Few countries in the world have such an enabling environment for investment in wider environmental goals. From the cornerstone importance of forest in the Constitution to the vision of green accounting in the Bhutan 2020 strategy (RGoB, 1999), the policy justification for protecting the country's environmental values is widespread through roadmaps, frameworks and planning strategies. A wealth of policies and laws enable the establishment of such mechanisms, and capable institutions are in place and motivated to carry them forward. Related initiatives are already ongoing, or planned, but lacking an independent and sustainable mechanism for collection and investment- Payment for environmental services (PES) approach can provide that the rationale supporting the development of this proposal is developed in the feasibility report in Part II.

Indeed, Bhutan extensive forest cover yields high revenues for the public re-investment. But at the local level its use is restricted and communities must invest in their own community forest resources. At the same time, these extensive forest areas, most of which fall within natural parks, are home to important wildlife, that is responsible for considerable damage to crops and livestock. In addition, the mountainous terrain impairs the opportunities for agricultural production- less than 8% percent of the total land area is cultivated and used for agriculture, on which about 69 percent of the population depends on for their livelihood. FAO's Right to Food Assessment for Bhutan (2008) clearly identifies land as the main asset influencing Food Security and Nutrition for rural households. Given the scarcity of agricultural land, and the intense use in some areas (particularly in the East), land degradation is an increasing concern. Thus, there is a pressing need to develop mechanisms to balance conservation and development and sharing of associated costs and benefits. Payments for Environmental Services (PES) have emerged as a means to bridge this gap and provide incentives for good stewardship of natural resources, by local communities.

In addition the main commercial users of these environmental services are also the two major sectors in the Bhutanese economy- Tourism and Hydroelectricity generation. This presents an excellent justification for additional investment in their resource base, and these sectors are not averse to doing so, provided there is clarity and rigour in the investment. The basis for earmarked investments lies in acknowledging: i) the benefits received by key sectors of the economy – hydropower, tourism-, and urban users and their values, ii) the need to compensate land managers for costs and foregone benefits of national nature conservation priorities. Thus, there is scope for activating these links between those who benefit from Bhutan's lush green mountains and stable watersheds–in and outside the country-, and those who live and manage them, under a mechanism that allows land managers to be paid for the physical services provided. Good performance monitoring together with a good funding design will be essential.

A key to maintaining the value of the rich natural resource base is to ensure that the local resource users and stakeholders benefit from their efficient and sustainable use of the resources and ecosystems. This is also crucial to local livelihoods and food security. There are still weak governance mechanisms for common forest resources and many resource users do not participate in decision-making. This creates conflicts over use of resources in some areas,

e.g. upstream land management – downstream water quantity and quality. Prices for agricultural products are extremely low, and with limited local agro-processing and markets for alternative products, land users do not have the capacity to invest (labour, cash) in long term management strategies and are discouraged by lack of access to land tenure and access to some forest-based resources.

The link between PES-supported activities and their translation into food security has not been explored widely so far, and this project will contribute to improve that understanding. In that end, the rural communities are the main target group of the project, with the premises that: (i) they are dependant on natural resources for their livelihoods and food security; (ii) they are major providers of environmental services that are benefiting other communities and sectors of activity; (iii) they do not benefit from this stewardship role, or in addition, bear the costs of its provision, in the form of restrictions to land and forest use.

## Objectives and expected outputs

The goal of the proposed project will be to improve natural resource management to enhance environmental service provision and rural livelihoods. Ultimately the activities aim to improving food security and nutrition, by increasing productivity of farming systems, resilience to climate change and compensating for cost incurred by the current environmental restrictions.

The specific objectives of the programme are:

- 1) Improve knowledge to justify ES investments
  - Assess and highlight value of the environmental services being provided by rural communities in Bhutan;
  - Build greater capacity for site-specific research, by developing a long term hydrological monitoring and modelling systems with a participatory approach to ensure trust and ownership of results.
  - Develop site specific knowledge to support land management decision making and inform stakeholder negotiations
  - inform about the link between PES and food security
- 2) Design and pilot participatory PES mechanisms
  - Validate methodology and pilot test innovative financing mechanism to protect or enhance their provision; and ultimately inform a national framework for using PES mechanisms
  - Demonstrate feasibility of centrally-endorsed requirement for plough back mechanism to support locally based land-managers provision of environmental services (ES) while improving local livelihoods and food security and poverty alleviation;
  - Engage local communities in improved natural resource management that may (i) protect or improve their resource base and (ii) generate off-site benefits to other ES users;
- 3) Develop national capacity for PES design and implementation
  - Build capacity of rural communities to harness funding to cover their costs as stewards of environmental services, which are the resource base of the most important economic sectors in Bhutan.
  - Strengthen capacity of managers to align efforts in particular related to combat land degradation, natural resources conservation, water management and climate change adaptation/mitigation in watershed management interventions

### Main outputs

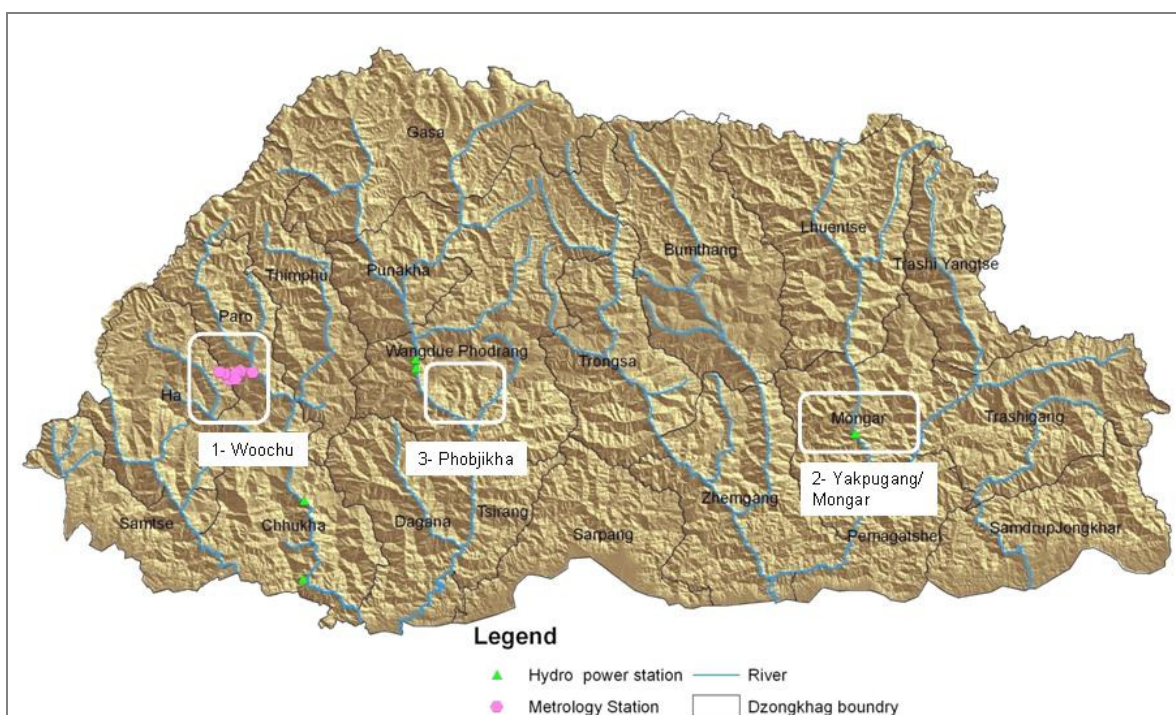
- Improved awareness of ES values by the service providers and the potential buyers

- Improved capacity on participatory ES assessment and action planning and PES design developed
- PES mechanism tested and documented (lessons for adaptation and upscaling)
- One to three PES agreements set with clear institutional support, MRV and investment mechanisms and directions for upscaling

## Pilot test - Tailoring PES mechanism for potential buyers

The project expects to test innovative financing mechanisms such as PES in different situations in order to inform a national PES framework. In that aim, it is proposed to begin with beneficiaries of environmental services that have a clear dependence on their provision and that are able to pay, such as the Hydropower, tourism or drinking water users, and focus on critical areas for the provision of environmental services they benefit from.

Three potential sites have been selected after a consultation process- for more details on the methodology used and findings see part II.



### 1) West Bhutan, focus on Hydropower

Almost all hydroelectricity being currently produced in Bhutan (90%) originates in the Wang Watershed and a pilot project is being proposed for one of its subcatchments- Woochu to explore ways of investing more effectively in watershed management activities and inform the existing investment being made by the Tala hydropower plant (at present, the largest in Bhutan). Woochu sub-cathment is located far upstream from the hydropower plant and represents the numerous subcatchments that make up the watershed and are responsible for

the water quantity and quality reaching the hydropower plant, in particular during the low flow season. The pilot will introduce improved land management options that can improve water retention and infiltration and reduce the need for inputs, with a view to improving the resilience of the farming systems (rather intensive in this area, for Bhutanese standards) and reducing the impacts on water flow and sediment load. In addition, at the local level, the Woochu stream is tapped, free of charge, by many water users within and outside the catchment: a large army camp the size of a small town, seed production industry, 3 other villages, the airport, schools. Local land-users are already in a process of getting an increased role in forest management as they have applied for a community forest permit with the intention of improving the management of the forest and also protecting the water source of the Woochu stream.

## **2) East Bhutan, Focus on urban drinking water users**

The village of Yakpugang is located in the headwaters of the water system of Mongar town water supply (one of the main cities of the East of the country). The pilot project being proposed here will analyse the causes of water scarcity and test how PES can be one of the mechanism to strengthen water source protection and secure supply from Yakpugang critical watershed. This is the only source of clean drinking water for the town and it is already limited during the dry season from November to February. Alternatives are costly and the municipality is concerned with the depletion of forest resources around Yakpugang and interested in supporting its improved management as a means of addressing this critical water issue. Water protection was also of the main reasons for the local communities to push for the creation of a 290 hectares community forest including the headwaters, established in 2001 and now in its second plan framed for 10 years. Communities consider that “water users” should contribute financially to their management, particularly for those water sources that they use. The community already incurs in costs by fencing off and setting aside forest from grazing around critical areas for water infiltration and collection, among other use restrictions. The pilot will also explore options for introducing SLM and more organic practices to reduce the need for chemical inputs and the risk they pose for water supply- in this area, water is not treated for chemicals and several of the water collection points are located downstream from the village’s fields. Despite the topography, in this area slopping land farming is done without use of soil and water conservation measures, leading to accelerated degradation and reduction in productivity. Food insecurity is high in this region and the project aims to design the compensation/incentive options with a focus on combining improved productivity with watershed protection.

## **3) Central Bhutan, focus on tourism**

Phobjikha valley is one of the main tourism hotspots in Bhutan for its scenic beauty and important biodiversity. The pilot will test forms of capturing tourism revenues locally, through the creation of a conservation and development fee, to be charged and invested in the Valley.. The large wetland in the upper valley is visited by increasing population of the endangered black-necked cranes residing over the winter and attracting thousands of tourists every year. Yet local communities face major limitations in terms of forest use, built area expansion, road building and even electrification has been delayed until donor funding has covered the higher costs of bird-friendly underground electrification. The main source of income is farming and in particular in the recent years intensive potato cultivation. This may threaten the integrity of the nesting areas for the migratory birds and the quality of the wetland with chemical pollution. The Phobjikha valley has been recognized as a conservation area and has a management plan that organise and engage local communities into conservation activity with the support of a local conservation NGO. The pilot aims to introduce this new fee and add its funds to the existing environmental management fund to support activities that can, at the same time, improve local livelihoods and income generation activities, while ensuring the protection of valley’s environmental and tourism values. This will include training to adopt low inputs agriculture techniques, production of a wider variety of produce and organizing a local supply chain to local hotels.



## **Broad description of the components/activities**

### **Component 1. Develop national capacity for PES design and implementation**

#### **Activity 1.1. Capacity building for PES development**

- Build capacities on PES mechanism and tools of PES facilitators – i.e. extension officers, technical experts- as they need to support ES assessment and ES action plan, PES design and PES implementation.
- Build capacity of rural communities to harness funding to cover their costs as stewards of these services, which are the resource base of the most important economic sectors in Bhutan.
- Build capacity of rural communities and government institutions for using payment for environmental services mechanisms to promote enhanced environmental quality and plough back benefit sharing through analytical work and knowledge sharing.

#### **Activity 1.2 Distil and communicate lessons to inform upscaling**

- Involve key officials from national government into pilot activities, especially at the design and evaluation workshops
- Engage local rural communities – key service providers- in improved natural resource stewardship that may (i) improve their resource base and (ii) generate off-site benefits to other ES users;
- Materials to inform policy-makers, nationally and in other PES initiatives in the Himalayas (possible link with FAO Asia-Pacific Regional Office - FAO Forest department regional initiative);
- Consolidation of an operational Manual on PES describing criteria for expansion site selection, focusing on cost-effectiveness of investments in relation to their early results in improving food security and environmental service delivery- this could inform other government policies directed at these benefits specifically, for example the fee system being introduced under the forthcoming water law.

### **Component 2 – Improve knowledge to justify ES investment**

The project would develop the scientific and economic basis necessary to inform ES investments and interventions, and support negotiation processes. In particular, it would develop basic knowledge on the environmental benefits of current conservation policies, and assess the additional benefits of specific interventions, to enable the design of an activity-based PES scheme. This will include contingent valuation of landscape management and biodiversity conservation, and a basic assessment of avoided costs for water-dependent sectors.

#### **Activity 2.1 Develop bio-physical arguments for negotiation**

- Hydrological studies building on SLMP work (in i- Wochu; ii-Mongar, iii- Phobjikha) looking at understanding water conditions and relationships between sustainable land management and hydrological impacts
- Understanding of interaction between mixed landscape systems and water and the effects of changes in land use practices in i) wochu (e.g. possible collaboration with FAO GHIAS and Bhutan/SLMP program) as well as in ii. Mongar
- Scenario analysis to model potential changes and their effects: forest vs farm land change; livestock management and ES conditions if degradation advances
- Identify what changes in land and water management should be introduced to improve ES delivery for specific buyers.

## Activity 2.2 Assess costs and benefits of ES investments

- Assess cost and benefits for the farmers of adopting required measures
- Valuation of the ES provided. A first approach will be to zoom on site 3- Phobjikha to conduct a contingent valuation to the tourists coming to the area. Carbon storage and sequestration benefits will also be assessed in this site, to assess the value of avoided emissions from wetland conservation and improved crop and grassland management.
- A livelihoods assessment will support that analysis by providing a basis to understand the viability of potential payments for watershed services to the individual farmers, farming households and the farming community.
- Analyse how PES can be designed for food security with improved understanding of linkages between PES supported activities and their translation into food security and understand how to target all livelihoods including the poorest and most food insecure. The project will explore conditions for success in rural communities and analyse the uptake and involvement of households according to their wealth and food security conditions<sup>1</sup>.

## Component 3- Participatory design and implementation of PES mechanism

The project would explore conditions for success of PES mechanisms in rural communities and analyse the uptake and involvement of households according to their ES delivery potential and willingness to participate. Detailed design will specifically address the issues highlighted in GEF STAP recommendations for PES development<sup>2</sup>, and combine the goals of generating additional funds (a financing tool) and using available funds to create private incentives for improved ecosystem management (a mainstreaming tool).

Phobjikha has clear potential for developing a PES and will be the first site to advance with mechanism design with the objective to increase the funds available for protection and improvement the biodiversity and landscape values of importance for the tourism sector. There is demand for certain specific environmental services – biodiversity and wetland habitat conservation, as well as overall landscape management within the valley. The links between service providers – farmers- and service beneficiary –tourists- are clearer. There are institutions in place that could coordinate the activities and directly liaise with participants. This is an area where food insecurity is high and where development opportunities are limited. The other two sites have also a potential but developing arguments for payment for the environmental services are a prerequisite prior to thinking of designing a PES mechanism:

- In i) Woochu, there is a need for a scientific base –hydrological processes- and economic arguments to inform negotiation with hydropower sector for ES investments and indicate interventions is needed (if at all).

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<sup>1</sup> PES setting up may involve medium term investments (costs and risks) for the rural communities when acting as service providers (i.e adopting new interventions or accepting to change land use practices). This project does not too target the most vulnerable and food insecure geogs. The three pilot sites are in some of the least food insecure geogs but averages at geog level may hide different realities at chiog level. The project would use a livelihood approach and would characterize natural resource dependence, vulnerability and relative wealth groups in order to target poor and food insecure households as much as possible. The livelihoods strategies of the service providers will be characterized by a livelihood survey, including poverty and gender analysis to characterize the community and its most vulnerable groups. The analysis will provide information regarding how much of the farmer assets can be used in PES agreements interventions without compromising his livelihood. Transaction costs provided by donors and potential buyers will then be allocated in such areas designated for land use change. The livelihood baseline would be mapped and would be used to monitor impacts on most vulnerable groups (poor or food insecure) of PES mechanisms and inform the compensation mechanism.

<sup>2</sup> GEF - Global Environment Facility- Scientific and Technical Advisory Panel Guideline Document on Payments for Environmental Services.

[http://www.gefweb.org/uploadedFiles/Documents/Council\\_Documents\\_\\_\(PDF\\_DOC\)/GEF\\_35/C.35.Inf.12\\_STAP\\_Guidance\\_on\\_PES.pdf](http://www.gefweb.org/uploadedFiles/Documents/Council_Documents__(PDF_DOC)/GEF_35/C.35.Inf.12_STAP_Guidance_on_PES.pdf)

- In ii) Mongar-, there are providers willing to engage in improved services and a clear demand for water as a good, but not of the water supply protection service and there is a lack of understanding of the causes of increased water scarcity. Therefore, a preliminary step is to improve the knowledge on the water conditions and on what additional activities in the community forest would improve the conditions (if they can).

Work in these two sites would fall under components 1 and 2, with a focus on improving capacity and knowledge to confirm PES feasibility at the site level, and could then possibly advance with PES design in a later stage.

### **Activity 3.1. Participatory ES assessment and action plan**

- identifying participant households and relevant activities, selecting eligible activities for funding under the fund (eg. financial assistance for house renovation and rural tourism facility development) and conditions to access the fund<sup>3</sup>. Activities eligible to be funded by the local PES fund would have to (i) contribute to wetland habitat protection including its water conditions, and scenic beauty and (ii) to improve local livelihoods (diversification and improvement of income).

### **Activity 3.2 Negotiating incentive mechanisms for adoption of action plan**

- calculating incentive levels and types (training on organic farming in the farmland along wetland slopes and support in creating local market for produce); designing new branch of existing community fund for local tourism fee system to be implemented under the project- a willingness to pay study will be used to calculate optimal fee level; designing mechanism for collection and investment<sup>4</sup>.

### **Activity 3.3. Establishing an institutional network for implementation and MRV**

- Establishing an institutional network to support implementation and Monitoring Reporting and Verification, over the 5 year period and annual evaluation

### **Activity 3.4 Develop PES agreements**

- In i) Woochu and ii) Mongar, if findings under component 2. From Y2 introducing changes and monitoring to inform design of PES agreement, assessing the food security implication of PES in Mongar, assessing what is the tourism implication of PES in Woochu.

## **Component 4- Project coordination and information management,**

This component will support overall project management and coordination, the M&E of project activities, outputs, and outcomes, and the dissemination of key information. Specifically, it will promote the effective management of the Project by expanding the resources available to WMD to meet the demands required by this collaborative project and its partners at central and local levels.

<sup>3</sup> Activities have already been discussed and proposed by RSPN during local consultation in 2009, and are recorded on RSPN 2009 and in annex 2 Findings of Field Consultations. For example, investments in rural accommodation improvements and local tourism services (improvements to RSPN visitor centre to include a weaving workshop and coffeeshop), expanding the local offer of guided tours, treks and information on the activities available and services offered locally, could increase tourism numbers, and extend length of stay and local spending.

<sup>4</sup> The “Phobjikha conservation and development fee” could be introduced in a voluntary basis, and with a minimum base amount, collected through accommodation bills for stays in the valley. While the new PES fund would represent an additional budget line to the community’s existing development fund, it would not cover the full package of activities offered to Phobjikha communities. Instead, it could act as a catalyst to attract existing support for improved land and livestock management could be re-directed here, like ongoing investment by the national organic programme or tourism training by TCB.

## Organization and project management

The project will be implemented by the Watershed Management Division (WMD), under the DoF, MoA, who has been given the mandate of coordinating and aligning natural resource management activities conducive to integrated land and water management, and its supporting role for biodiversity conservation, landscape management and carbon storage and sequestration. Through close collaboration with the other RGoB departments, especially NCD and TCB and other development partners (RSPN, SLMP, SNV etc). WMD will ensure integration of all four environmental services in the projects activities. The optimal combination of organizations and responsibilities will be tested through this pilot project to inform the eventual establishment of a national coordinative body for PES interventions.

Within WMD, the Director of the division will act as the Director of the project but will delegate implementation to a Project intervention Unit (PIU). The PIU project manager will lead the team and would have (i) have good knowledge of project management, (ii) dedicate full time to managing the project, (iii) have good links and knowledge of NGOs in the field, (iv) strong understanding of PES mechanisms and (v) an experience of participatory processes and a practical experience to address natural resources management issues

The technical division of the Ministry of agriculture (Forest, Livestock, agriculture, Marketing) and Research (RNR-Yucipang, Bajo, and Wengkar; Soil Research Centre) agencies will play an active role in the implementation of project activities, being primary implementers in the areas of management, capacity building, rural extension, and research and studies. Partnership with key rural development and environmental institutions, including the Natural Conservation Division (NCD) and the Social Forestry Department will be important for implementing coordinated activities under Component 2. Local technical officers under the Dzongkha and Geogs administrations will be instrumental during the participatory activities and planning stages.

## Project budget

This proposal suggests combining different partner's contributions, with the objective to engage them early in the project design to build a sustainable funding approach. In that aim, it proposes to establish a broad based partnership arrangement, with institutions that can channel existing funding or fund raising activities in their regular programme of work, to the activities proposed here.

The following potential contributions have been identified and should be further explored.

In Bhutan

- RGoB co-funding of WMD coordination time and allocation of staff time in the Dz and geog technical staff;
- TCB (with SNV) and NCD assistance in aligning work in component 3. into RGoB rural tourism development policies;
- RC centres co-funding by mainstreaming the research required here into their ongoing work
- Sustainable Land Management Project (SLMP) grant for activity 2.1(possibility of collaboration with modelling work under ongoing SLMP and FAO RAP and FORC support from one of their projects)
- HP-Hydropower plants (Tala, Chuka) and MoA DoF to agree on re-directing existing compensatory afforestation funds to understanding hydrological processes linked to changes in land uses under component 2.1;
- RSPN mainstreaming the activities required here into their ongoing work in Phobjikha

Outside Bhutan to support the pilot testing phase

- ICIMOD/IFAD Project on Livelihoods and Ecosystem Services in the Himalayas PES component
- FAO with IFAD support (+ Regional project & FMPP) short term follow up feasibility project and
- SNV & DANIDA support to PES design in their country portfolio
- Voluntary carbon market for soil carbon credits, in collaboration with the National Environmental Committee and its work under the REDD+ mechanism

An estimated 1,000,000 USD would be necessary over a 5 years period to design and negotiate PES mechanisms. It does not account for the cost of environmental management interventions and monitoring which should be covered by the prospective buyers. Hydropower has already assigned funding for watershed management in the Wang watershed, and the Tourism Council has funding commitments consistent with some of the activities envisaged here. Part II develops these arguments further.

Budget and Workplan of Project Activities Y1-Y2	USD	2010			2011	
		May-June	July-Sept	Oct-Dec	Jan-June	July-Dec
Component 1. Develop national capacity for PES design and implementation	300,000					
Activity 1.1. Capacity building for PES development		X	X	X	X	X
Activity 1.2 Distil lessons to inform upscaling				X		X
Component 2 – Improve knowledge to justify ES investment	250,000					
Activity 2.1 Develop bio-physical arguments for negotiation		X	X	X	X	X
Activity 2.2 Assess costs and benefits of ES investments		X	X	X	X	X
Component 3- Participatory design and implementation of PES mechanism	300,000					
Activity 3.1. Participatory ES assessment and action plan for biodiversity conservation and landscape		X	X		X	X
Activity 3.2 Negotiating incentive mechanisms for adoption of action plan: calculating incentive levels				X	X	X
Activity 3.3. Establishing an institutional network to support implementation and MRV		X	X	X	X	X
Activity 3.4 Develop PES agreements Wochu and ii) Mongar					X	X
Component 4- Project coordination and information management	150,000	X	X	X	X	X

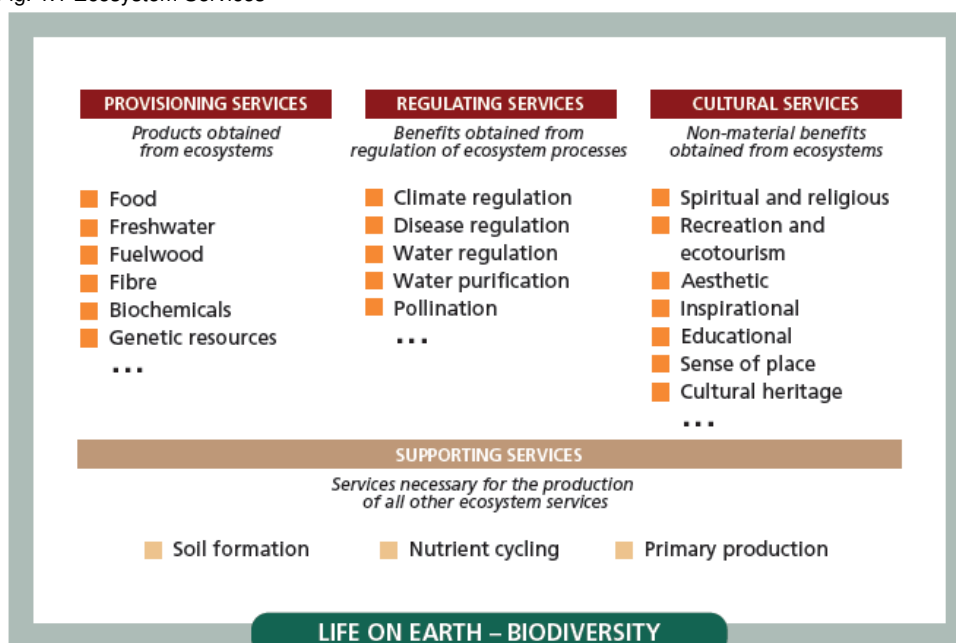
## PART II- Feasibility report

### Opportunities and Mechanisms for PES development in Bhutan

#### 1. Rationale for Paying for Environmental Services

Ecosystem services are defined as all benefits that humans receive from ecosystems. These can be direct as provisioning services or indirect through the supporting and regulating functions of ecosystem processes. While the benefits of provisioning services are tangible (food, timber, water) and have a market value, the regulating and supporting ecosystem services responsible for their production are less visible and the cost of maintaining them is rarely incorporated in their sale price.

Fig. 1.1 Ecosystem Services



Source: FAO. 2007. The State of Food and Agriculture 2007. Part I: Paying farmers for environmental services. Rome, adapted from Ecosystems and Human well-being: a framework for assessment by the Millenium Ecosystem Assessment. Copyright © 2003 World Resources Institute. Reproduced by permission of Island Press, Washington, DC

Payments for Environmental Services (PES) represent a form of accounting for the value of ES and ensuring adequate investment in their maintenance. The payments reflect the change in service resulting from specific natural resource management decisions, rather than the natural ecosystem service functions themselves- hence the use of the term "payment for environmental services", instead of "payment for ecosystem services". Of the numerous ecosystem services, for which agriculture has a crucial role to play, PES schemes have focused on four main groups:

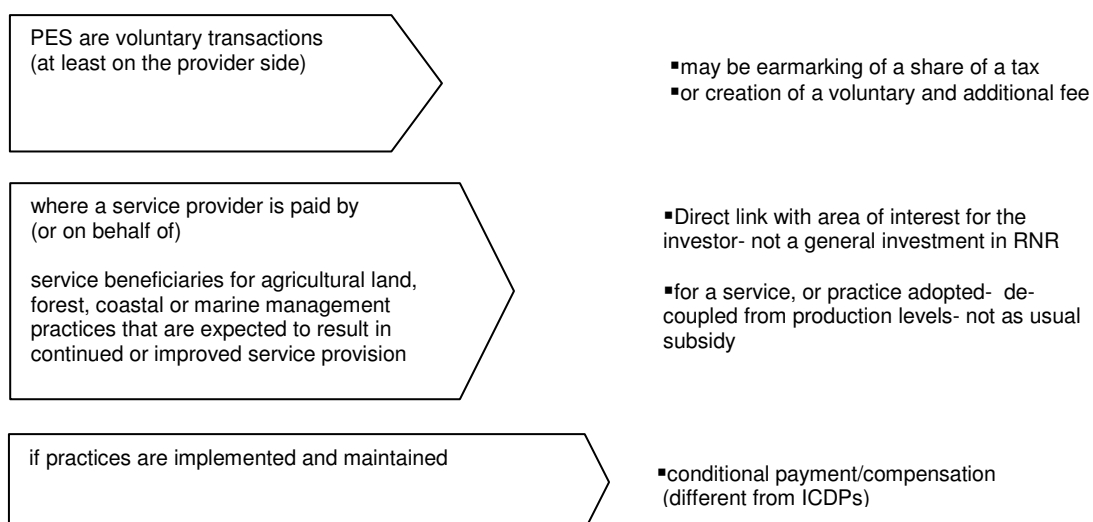
- **biodiversity conservation**, normally associated with either supporting the protection of remaining areas important for wild biodiversity or enhancing the quality of on-farm habitats and agro-biodiversity. Mechanisms used include additional entrance fees to protected areas, to invest in the ecosystem management specifically or in reducing pressure in the ecosystem from unsustainable NRM.
- **and landscape aesthetics**, involving the protection or enhancement of landscape features, like forests, rice paddy terraces or extensive pastures and associated herder livelihoods, that are valued for their aesthetic and cultural aspects, and most directly used by the tourism industry. Payment schemes with these goals usually rely on providing incentives for

maintenance of certain features, offering financial incentives for their upkeep, or helping to develop market alternatives that ensure their economic viability, for example, developing ecolabelled products and services.

- **watershed management**, aiming mainly at supporting the adoption of land, forest and water management technologies that can increasing water use efficiency and protect or improve water quality, by controlling erosion and run-off. The aim is often to reduce sediment load in streams to reduce negative impacts on hydropower generation turbines, and limit the risk of landslides and impact of floods. Some schemes also aim to increase infiltration and dry season flows, or to reduce run-off to limit the chemical or nutrient water pollution arriving into surface water bodies. Incentives for farmers usually take the form of training and in-kind contributions to the adoption and maintenance of soil and water conservation structures, or for setting aside areas of high hydrological importance.
- **carbon sequestration**, similar incentives can be used to encourage adoption of practices that can increase sequestration of carbon dioxide from the atmosphere and its long-term storage in plant biomass and soil organic matter, with a view to contribute to climate change mitigation.

PES schemes refer to “voluntary transactions where a service provider is paid by, or on behalf of, service beneficiaries for agricultural land, forest, coastal or marine management practices that are expected to result in continued or improved service provision beyond what would have been provided without the payment” (FAO, 2007). While PES agreements are always voluntary on the provider side, the farmer or forest managers, contributions for PES programmes may be imposed through government programmes, with a view to securing earmarked investments in the resource-base of the sectors contributing. Some of the existing national PES programmes are also funded by a combination of environmental taxes and voluntary contributions from the direct users. The main difference between PES and other conservation and development approaches lies in the conditionality of payment- land managers are only entitled to received compensation or incentives if the land management options agreed are in fact implemented and maintained (box 1.1).

Box 1.1. Distinguishing PES versus other similar mechanisms



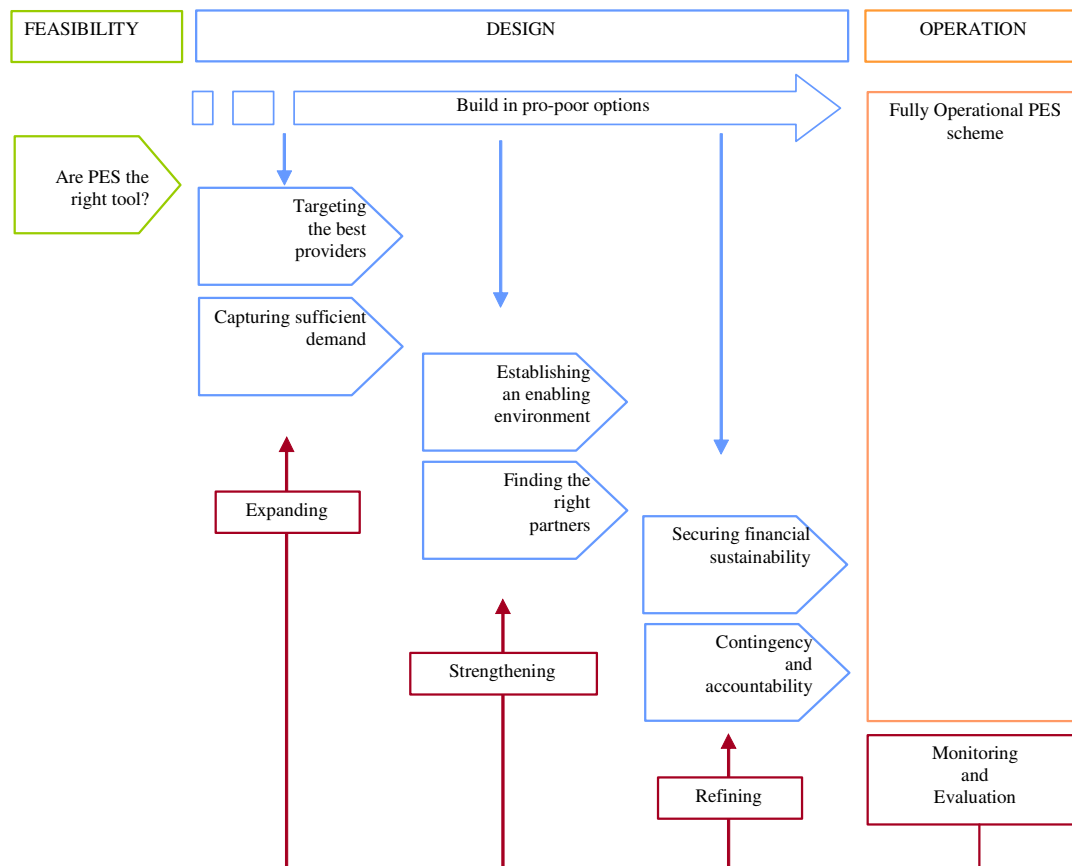
Securing meaningful contributions from the private sector requires a strong “business case” (Branca et al. 2009) demonstrating the economic interest of investing in activities that can

protect or enhance environmental services. Several methods exist to help assess the value of these services<sup>5</sup> and inform negotiations and PES design. However, keeping negotiation, design and operation costs low and combining poverty alleviation goals with environmental conditionality is still one of the major difficulties faced by emerging PES schemes. Legal impediments in creating new environmental charges and investing in trans-administrative areas are other possible obstacles.

Despite these difficulties, the advantages of aligning conservation and development efforts under a common PES framework, may avoid duplication of funding efforts and maximize environmental benefits. In addition, since PES is voluntary on the provider side, it allows for meaningful community participation. Because it also requires private sector buy-in, it clarifies the link between land managers and indirect users of resources, improving environmental awareness of other sectors of economy.

Normally, the support team for a PES scheme is led by a main intermediary who leads consultations for PES design and negotiation, supervises implementation and operation. Local intermediaries, like producer cooperatives or local development associations reproduce these roles at the local level and communicate local interests, concerns and goals to the main intermediary. They also help with negotiation and promotion at the local level, may provide technical support with application procedures and can conduct participatory monitoring of activities. A group of facilitators supports both levels of intermediation, especially during the design phase. They may provide loans and grants for capacity-building and technical support with land management techniques, scientific research to inform design and monitoring and verification packages. For an overview of the stages and partners in PES design, see diagram in fig. 1.2 and visit: <http://www.fao.org/es/esa/PESAL/PESdesign.html>

Fig. 1.2 PES setting up process



<sup>5</sup> Source: adapted from PESAL website ([www.fao.org/es/esa/pesal](http://www.fao.org/es/esa/pesal))



## 2. Methodology

The methodology used for this assessment was designed to facilitate exchanges among stakeholders who a) had an interest in innovative financing mechanisms for rural development, b) responsible for land and management and c) whose economic activity was highly dependent on NRM, by rural communities. This included government technical departments in Thimphu and in 3 districts (Punakha, Wandgüe and Mongar), as well as NGOs working in related areas and donor agencies with an interest in adding support for PES development in their investment portfolios.

The first stage was based on a series of **interviews with policy-makers, NGOs and donors** based in Thimphu to (i) Clarify needs for PES investment, under multiple perspectives and (ii) scope opportunities to align with ongoing and planned PES-related work in Bhutan.

The following step was to hold a **national feasibility workshop with NRM practitioners and policy makers** to (i) Identify priority areas for these interventions and begin (ii) building a rationale for PES in Bhutan. Working sessions were designed to:

- a) Assess ES supply:
  - Identify the main environmental problems that could be addressed by PES;
  - Identify critical areas for land-based interventions to conserve or increase ES provided by rural communities
  - Assess the different types of environmental services being provided within watersheds and land use systems
  - Discuss options for enhancing ES through changes in land, water and forest use and landscape management
- b) Assess ES demand:
  - Consider the value of those services for different sectors of society and especially those who use these services commercially- ie. whose economic activities relies on their continued supply, but whose activities do not invest in their maintenance
  - Discuss willingness to pay for ES provision, from the main users identified
  - Identify critical areas for user- financed interventions to improve land and water management and rural landscape value enhancement where the pilot projects could be implemented.
- c) Evaluate enabling environment
  - Assess how existing policies and institutions can support PES development in the Bhutanese context
  - Discuss mechanisms for establishing PES by building on existing initiatives and institutional capacity

**Field-level consultations** followed in three districts to allow for informal discussions and group meetings with local communities to understand their priorities and perceptions of the environmental services they provide. It was also an opportunity to discuss possible incentives and transfer channels to support them in adopting measures that could improve ES provision or protection. This exercise was conducted with an interdisciplinary team, including the Watershed Management Division (Dep. of Forest) and the Planning and Policy Division of the Ministry of Agriculture, with an expert from the Agriculture Research Centres, as well as the relevant technical forest, agriculture and environmental technical officers at district and sub-district levels.

Results were presented at a **debriefing workshop** to confirm feasibility arguments and priorities for pilot design. Draft feasibility report and proposal were circulated to partner organizations for comments and to gather a sense of their endorsement to the collaborative activities and institutional arrangements envisaged in the project proposal.

### 3. Discussion of results: A SWOT analysis for PES development in Bhutan

#### 3.1. STRENGTHS of PES development in Bhutan

##### — PES can help share the costs of conservation between the beneficiaries

While the hydropower and tourism sectors benefit from favourable environmental conditions to their activity, the costs of extensive forest conservation are born by the public investments and development restrictions to rural communities. Currently only about 8% of the total land area is cultivated and used for agriculture by some 69 percent of the population; expansion is only seams feasible to 12%. Food insecurity is still a serious problem in many parts of Bhutan and about 30% of Bhutanese live below the national poverty line: Nu 740 per capita per month (or about 0.5 USD a day). PES gives these sectors an opportunity to take more responsibility for investment in their own resource base, in activities of specific interest to them, and directed to rural communities who are in fact the managers of these resources.

At present, 70% of Bhutan's land area is covered by forest. Much of these areas are also designated as protected, with various degrees of use restriction or being explore for timber within Forest Management Unit (FMU). Rural communities may use these forest resources for household consumption (fuelwood, leaf litter collection and non-wood forest production) under specific allowances and fees. While Community-managed forests are growing fast, they are still very limited and at an early stage to provide revenues in many cases. Thus, the land that can be managed by rural communities is still highly limited, and so are the commercial benefits they can draw from it (table 1). While nature conservation goals are significant, PES can be a mechanism to balance RGoB's commitment to maintain the current extensive forest cover and to provide equitable development opportunities to rural communities (see table 3.1).

Table 3.1- Land use and ES beneficiaries

Land use	Beneficiaries of the ES provided (enjoying benefits + or bearing use restrictions)						
	Community			Nation			Global
	FU	A	L	Timber extraction	Hydrop & other water users	Tourism	
Protected Areas (50% land area)	-	--	+	-	++ +++ drinking water	++	++
Total public and protected forest (72% land area)	-	--	++	-	++	++	++
FMUs	-	-	-	+++	-	-	-
Community forest (0.6% land area*)	++	++	++	-	++	+	+
Farming land (8% land area)	+	++	+	-	-	++	+

\*data: SFD internal data: total area of community forest is at the time of writing, 22,820ha over 178 CF units

FU-Forest users; A- Agriculture; L- Livestock

Given the appropriate conditions PES schemes can compensate natural resource managers for resource use restrictions and the environmental service delivery these restrictions protect. Bhutan has substantially high land use restrictions, both due to the mountainous topography and inaccessibility, and due to strong conservation policies. In this context, PES can act as a mechanism for benefit-sharing and increase investment in rural development. Beyond agriculture, Hydropower generation and Tourism are the main commercial users of the environmental services provided by the national investment in forest, and its associated biodiversity and landscape protection benefits.

##### → Why should hydropower contribute more for watershed management

Due to the good vegetation cover in the watersheds, and to the abundant rains, Bhutan is endowed with important water resources of good quality. Hydropower is the larger user of this

abundant water source and a user able to pay. Hydropower generation is the backbone of the Bhutanese economy (Water Policy 2007) and its role is growing fast (tables 3.2 and 3.3). Currently, total installed capacity of the Druk Green Power Corporation Limited (DGPC), the national HP company, publicly owned and privately managed<sup>6</sup>, currently stands at 460 MW. RGoB's new target of an installed generation capacity of "10,000 MW by 2020", of a gross potential of 30,000MW of which 23,500MW are currently considered economically feasible (RGoB, 2003). Today the sector contributes with over 20% of the country's GDP and electricity generation the single biggest contributor to the economy (National Forest Policy draft, 2008), making "reliable supply of quality water is the most valuable commercial product derived from Bhutan's forests"<sup>7</sup>.

Year	Generation (GWh)	Total Revenue (Nu. Million)	Export to India (GWh)	Revenue from India (Rs. Million)	Sale to BPC (GWh)	Revenue from BPC (Nu. Million)
1986	164	41	155	41	6	1
1990	1,540	388	1,386	374	134	13
2000	1,908	2,359	1,460	2,242	388	117
2008	2,524	4,319	2,056	4,073	426	246

Source: DGPC profile, 2009

Project Name (location)	Installed Capacity-MW	Construction Period
Punatsangchhu I HEP, (West)	1200	2008-2015
Mangdechhu HEP, (West)	720	2009-2016
Punatsangchhu-II HEP (West)	1000	2009-2016
Bunakha Reservoir (West)	180	2010-2016
Wangchhu Reservoir (West)	900	2010-2017
Chamkarchu-I (Centre)	670	2011-2017
Kholongchhu (East)	486	2011-2017
Amochhu Reservoir HEP, Haa (West)	620	2012-2018
Kuri-Gongri HEP (East)	1800	2012-2019
Sunkosh Reservoir (West)	4000	2011-2020

Source: 10<sup>th</sup> Five Year Plan, Main doc, Vol I

As a compensation for use of Bhutan's extensive water resources, the sector pays a 15% royalty on its annual revenue, but these funds are not earmarked for forest protection or wider watershed management<sup>8</sup>. Most of this investment comes from the RGoB: support for forest protection and reforestation is about 1/3 of the budget allocated to the Ministry of Agriculture

<sup>6</sup> by Druk Holding and Investment: <http://www.dhi.bt/include/englishcharter.pdf>

<sup>7</sup> <http://www.moa.gov.bt/moa/downloads/downloadFiles/MoADownload3ea6992sr.pdf>

<sup>8</sup> These funds are invested in the expansion of rural electrification, which the energy sectors considers to be already an investment in watershed management as it reduced the need for fuel wood collection, but whether farmers do switch to electric heating depends on the price of electricity, that although heavily subsidized, is still considered too high for most rural households. The royalty is paid in the form electricity delivered free of charge to Bhutan Power Corporation (BPC), responsible for distribution and transmission, who uses its value to offset the costs of continuing rural electrification efforts-in rural Bhutan, family homes are dispersed along mountain slopes which considerably increases the costs. RGoB, in its Vision 2020, has a target to provide "Electricity for All by 2013", which will mean an extension of the current grid to additional 40,000 rural households (or about double of current coverage).

under the 10<sup>th</sup> five-year plan, or about Nu 1 billion (or about Nu200M a year)<sup>9</sup>. The specific watershed management activity (MoA/21) under this plan focuses specifically on plantation and assigns half of its funding to this activity (box 3.1 and table 3.4). More of this investment responsibility should be shifted to the companies that directly benefit from these interventions, to release more public funding for livelihood-fuelling activities like crop diversification, livestock improvement and sustainable land management, capable of halting land degradation and improving farm productivity (table 3.5), food security and nutrition and increasing resilience to climate change vulnerability.

box 3.1 RGoB investment in watershed management 2008-2013

**MoA/21: WATERSHED MANAGEMENT AND PLANTATION PROGRAMME**

2	<i>Linkage to National Development Objectives &amp; Strategies</i>	:	<i>Synergizing Integrated Rural-Urban Development and National Spatial Planning for poverty reduction and improved rural livelihoods through promoting sustainable utilization of water and forest resources while promoting environmental conservation</i>
3	<i>Expected Results</i>	:	<i>Master-plan for atleast 2 river basins developed and implemented; Degraded and barren forestlands mapped; 10,000 acres of plantation established, 12 nurseries created.</i>

**Indicative Cost**

#	Description of Projects/Activities	Indicative Cost (Nu. in million)
1	Strengthening institutional mechanism for effective watershed management	5.000
2	River basin level watershed management planning	18.000
3	Sub-catchment level watershed management planning and implementation	40.000
4	Mapping of degraded and barren forestlands	5.000
5	Afforestation and Re-forestation	40.000
6	Strengthening nurseries management	15.000
<b>Total</b>		<b>123.000</b>

Source: GNHC, 2009

Table 3.4 RGoB investment in agriculture 2008-2013	Million Nu
MoA/10 Rural Access 516.090	516
MoA/16 Livestock Production 442.640	444
MoA/09 Integrated Soil Fertility & Sustainable Land Management 266.000	266
<b>MoA/22 Forest Protection 243.040</b>	<b>243</b>
MoA/25 RNR Research Programme 214.850	215
<b>MoA/23 Nature Conservation 190.000</b>	<b>190</b>
<b>MoA/24 Forestry &amp; Environmental Education 170.550</b>	<b>171</b>
MoA/15 Livestock Breeding and Input Supply 146.670	146
MoA/14 Livestock Health & Laboratory Services 145.492	146
<b>MoA/21 Watershed Management and Plantation 123.000</b>	<b>123</b>

<sup>9</sup> Of a total of Nu 3.6 billion attributed to MoA activities, Nu 1 billion is being invested in MoA/22 Forest Protection 243.040; MoA/21 Watershed Management and Plantation 123.000; MoA/20 Forest Resources Development 89.850; MoA/18 Participatory Forest Management 83.200; MoA/19 Non-Wood Forest Resource Development 65.000; MoA/24 Forestry & Environmental Education 170.550; MoA/23 Nature Conservation 190.000 and MoA/29 National Biodiversity Conservation Programme 89.220

MoA/06 Horticulture/Cash Crop Development 118.850	119
MoA/28 Bio-security and Quality Assurance Programme 117.185	117
MoA/27 Agriculture Marketing Programme 114.870	115
MoA/02 Post Harvest Management 99.500	100
<b>MoA/20 Forest Resources Development 89.850</b>	<b>90</b>
<b>MoA/29 National Biodiversity Conservation Programme 89.220</b>	<b>89</b>
<b>MoA/18 Participatory Forest Management 83.200</b>	<b>83</b>
MoA/04 Irrigation & Water Management 70.500	71
<b>MoA/19 Non-Wood Forest Resource Development 65.000</b>	<b>65</b>
MoA/11 Farm Mechanization 60.696	61
MoA/01 Commodity/Cereal Development 60.000	60
MoA/08 National Medicinal and Aromatic Plants 40.450	40
MoA/17 Targeted Highland livelihood Support 34.760	35
MoA/03 Integrated Pest Management 30.000	30
<i>MoA/07 Organic/Natural Agriculture 24.500</i>	<i>25</i>
<i>MoA/13 Feed &amp; Fodder Development 23.076</i>	<i>23</i>
MoA/05 Seed and Plant Development 20.000	20
MoA/26 Rural Development Training Programme 14.520	15
MoA/12 Extension Coordination and Information Management 12.000	12
Total MoA	3,626
<b>Forest-related</b>	<b>989MNu</b>
<i>Farmland and livestock</i>	<i>1,119MNu</i>
<b>TOTAL RGoB investment 2008-2013</b>	<b>73,611</b>
Innovation, Creativity and Enterprise (ICE) 1,569.265	1,569
Strategic Infrastructure (SI) 17,506.831	17,507
Integrated Rural - Urban Development and Poverty Alleviation (IRUDPA) 20,301.069	20,301
National Spatial Policy (NSP) 6,239.093	6,239
Enabling Environment (EE) 4,816.630	4,817
Strategic for Knowledge, Innovation and Life-Long Learning Skills (SKILLS) 18,645.536	18,646
Health 4,533.336	4,533
Source: adapted, GNHC, 2009	

Table 3.4 Incremental financial benefits of green water management in Kenya (Ksh/ha/yr)

	<i>Contour Strips</i>		<i>Mulch</i>		<i>Tied ridges</i>	
	<i>1996</i>	<i>1997</i>	<i>1996</i>	<i>1997</i>	<i>1996</i>	<i>1997</i>
<i>Maize</i>						
Groundwater recharge (Ksh/ha/y)	0.7	3.9	1.3	5.9	1.1	7.2
Runoff (mm/y)	-0.7	-4.0	-0.8	-5.1	-1.1	-7.4
Soil loss (Ksh/ha/y)	-15.4	-130.6	-15.4	-130.6	-15.4	-138.3
<i>Tea</i>						
Groundwater recharge (Ksh/ha/y)	0.5	2.1	1.0	3.3	0.6	3.1
Runoff (mm/y)	-0.4	-2.2	-0.6	-3.1	-0.6	-3.1
Soil loss (Ksh/ha/y)	0.0	-23.0	0.0	-23.0	0.0	-15.4
<i>Coffee</i>						
Groundwater recharge (Ksh/ha/y)	0.3	1.9	0.7	2.8	0.4	2.6
Runoff (mm/y)	-0.3	-1.9	-0.4	-2.7	-0.4	-2.7
Soil loss (Ksh/ha/y)	-23.0	-215.1	-23.0	-215.1	-23.0	-161.3
N content of 1 kg soil	0.0040	Source: MONQI data LEINUTS Nyeri, 1997				
CAN fertiliser N content	0.21	"				
Price 1 kg CAN (US\$)	0.40	Constant prices US\$ 1997				
Price 1 kg N (US\$)	1.90	"				
Price of 1 kg soil (US\$)	0.0077	"				
Price of 1 ton soil (US\$)	7.68	"				
Price of irrigation water (\$US/m <sup>3</sup> )	0.0021	Source: field data October 2007 Constant prices US\$ 2007				

Source: Porras et al, 2007

→ **Why should tourism contribute more to the management and development of protected areas?**

Outside officially designated protected areas “conservation areas” are also demarcated to protect hotspots for biodiversity (like the Phobjikha valley, in Wangdue, an important endangered bird habitat) or landscape along tourism corridors (like many of the high mountain passes). However most of these areas do not have a clear management plan nor public funding allocation to support local conservation goals (fig. 3.1).

Tourism is one of the major sectors in the country, growing fast and with potential to be increasingly important in the future: “a destination for the new millennia” as promised on arrival at Paro Airport. In only a few decades (see box 3.2), tourism has become one of the pillars of Bhutanese economy and the main earner of foreign currency. While in 2000 there were only 7,559 visitors, in 2008 Bhutan received 27,655 fee-paying international tourists, generating revenues of about US 40million. In addition regional tourists, from the neighbouring countries and who are not subject to the international daily fee system, may have amounted up to an additional 50% in number of entries (TCB, annual report 2008). RGoB expects to increase tourist arrivals over the next years, to reach 100,000 by 2012<sup>10</sup> which is likely to substantially challenge the available tourism infrastructure and require large investments in product

<sup>10</sup> According to the latest discussions- <http://www.bhutanobserver.bt/2010/bhutan-news/02/stakeholders-debate-new-tourism-policy.html> and <http://www.tourism.gov.bt/news-press/performance-compact-signing-by-ministries.html>.  
A previous goal was 250,000 by 2013 <http://www.kuenselonline.com/modules.php?name=News&file=article&sid=13822>

development to improve seasonal distribution, and the quality and placement of Bhutan as an international tourist destination.

The RGoB 10th five year plan sees the sector as “a critical growth sector that could boost employment among youths and alleviate poverty conditions in rural Bhutan” and assigns funding for activities that can supplement rural income and improve living standards and quality of life of rural communities in Bhutan (GNHC, 2009b). The McKinsey review<sup>11</sup> on Bhutan’s future economic driving forces puts Tourism in the first row, as the future provider of earnings and employment, especially in the rural areas. If that’s to materialize, greater efforts need to be focused on increasing the capacity of rural populations to become viable entrepreneurs and to remain the stewards of the rural landscape tourists come to appreciate. Therefore, the tourism industry also has a strong incentive to invest more, and more directly, in nature-based tourism products and in the communities that manage them. Most tourists come to Bhutan to enjoy the cultural authenticity and the luxuriant natural environment (TCB annual report 2008); certainly the overall tranquil landscape is the frame that gives Bhutan its niche market value. The landscape in tourism corridors (eg. passes, valleys) should be protected with the populations who live in it, and whose land management decisions shape its visual quality.

Substantial investment are to be made in rural areas, to raise capacity for business development and offer new and local goods and services (box 3.3), and a part of this funding already originates from the sector itself. About 30% of annual revenue (or USD12M in 2008) is passed to RGoB as Royalty for the use of Bhutan’s natural resources. A part of the royalty (25% or Nu 139M/USD 3M) is planned to be invested in the Tourism Council of Bhutan (provision put forward in the draft Tourism Bill of Bhutan 2009, July 2009).

The council has the mandate to foster the development of the tourism sector, mainly through training and marketing. If Bhutan is to develop the capacity to host the projected number of tourists, substantial investment will be required in rural areas, both in the development of tourism products and services, but also in the protection of the landscape values on it’s the industry stands. Creating mechanisms to capture more tourism revenues in local areas can increase funding for these activities and tight it closer together with the local communities to secure their long-term commitment in improved management. Increasing conservation-related local goods and services can support income-generating activities that divert pressure from forest conversion and give a use value to forest protection<sup>12</sup>.

Currently, however, rural areas benefit very little from tourism. Thimphu-based tour operators provide all services required (transport, guide, and affiliated accommodation) and often bring in food from the capital. Local offer of accommodation is limited in rural areas, and hotels are generally not owned or managed by locals. Development of traditional products for the tourism sector could also act as an incentive for the maintenance of certain components of traditional farming systems, of importance for biodiversity conservation and for its cultural values (eg. traditional buckwheat foods, or yak products).

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<sup>11</sup> Kuensel online, 28 October, 2009 <http://www.kuenselonline.com/modules.php?name=News&file=article&sid=13822>

<sup>12</sup> As is the case in the Nabji Korphu community nature-based tourism pilot project, in Jigme Singye Wangchuck National Park (a collaboration between TCB, SNV and NCD)

### Box.3.2 Milestones of tourism development in Bhutan

Until the early sixties, the Kingdom of Bhutan was accessible only by foot through the high passes of Tibet and the plains of India. The construction of a road in the late sixties from Phuntsholing on the Indian border to Thimphu and Paro made travel by car and bus possible.

1971: First draft of the rules governing tourism was passed during the 36<sup>th</sup> session of the National Assembly.

1974: First batch of tourists visited the country during the coronation of our 4<sup>th</sup> Druk Gyalpo, His Majesty Jigme Singye Wangchuck

1974: Department of Tourism created under the Ministry of Finance.

1983: DoT changed into a corporation owned by RGoB and renamed Bhutan Tourism Corporation (BTC) under the Ministry of Communication and Tourism.

In 1983, the first international airport was opened in Paro, 65 km from the capital of Bhutan, Thimphu.

1989: BTC incorporated as an autonomous body under the Chairmanship of Tengye Lyonpo.

1991: Tourism was privatized. Tour operations restricted to only 33 tour operators. Tourism Authority of Bhutan (TAB) was established as a regulatory body.

1998-1999: TAB restructured into the Department of Tourism under the Ministry of Trade and Industry

1999: Tourism licence was freed. As of 2007 there were 198 tour operators in operations as to 387 licence holders.

2008: Tourism made autonomous under the Chairmanship of the Prime Minister. DoT restructured into the Tourism Council of Bhutan (TCB).

Source: Tourism Council of Bhutan website [www.tcb.gov.bt](http://www.tcb.gov.bt)

### Box 3.3 RGoB Investment in Sustainable Tourism Development 2008-2013

#### TCB/01: SUSTAINABLE TOURISM DEVELOPMENT PROGRAMME

<i>Linkage to National Development Objectives &amp; Strategies</i>	:	<i>Vitalizing Industry for growth and poverty reduction through sustainable tourism development</i>
<i>Expected Results</i>	:	<i>Increased contribution to national revenue, employment opportunities and rural income.</i>

#### Indicative Cost

#	Description of Projects/Activities	Indicative Cost (Nu. in million)
1	Development of new and innovative products	25.710
2	Development of products to offset seasonality	21.140
3	Development of products to ensure regionally balanced development	10.570
4	Nature based tours – survey and development of new trekking routes	2.000
5	Product Development Manual	6.500
6	Education and awareness building activities	5.000
7	Infrastructure development and other services	79.500
8	Research, marketing and development of market strategy	
9	Hospitality training services	
	<b>Total</b>	<b>150.420</b>

RGoB 10<sup>th</sup> Five year plan (GNHC, 2009b)

#### — PES can improve the supply of environmental services

If on one hand land use restrictions ensure environmental protection of vast areas, at the same time, these restrictions increase pressure on the limited land that is available. Most farmland is located on sloping land and prone to heavy erosion. While currently, and at a macro level, land and water management in Bhutan is still in good condition, at the micro level there are many areas of concern, especially in the more heavily populated districts of the East, but also in the fast growing urban areas. At present, neither tourism nor hydropower has important activities in the area, but this is planned to change in the near future. In the same way, these same problems may affect western watersheds, as population grows and if proper measures are not taken.



PES can act as incentives for adoption of improved practices and increase ES provision, such as improved water quality, regulation of base flow and maintenance of landscape values along important tourism corridors, of current or future value to specific users- user-pay PES. Tourism and Hydropower, being the two main drivers of future economic development, should be willing to pay for the careful management and investment in their own resource base. In addition, Bhutan is a global carbon carbon sink that could develop a large supply of credits for emission reductions, increasingly with high demand in the voluntary carbon market, especially under the REDD+ mechanism.

→ **Why should HP and drinking water supply services pay for improved land and water management?**

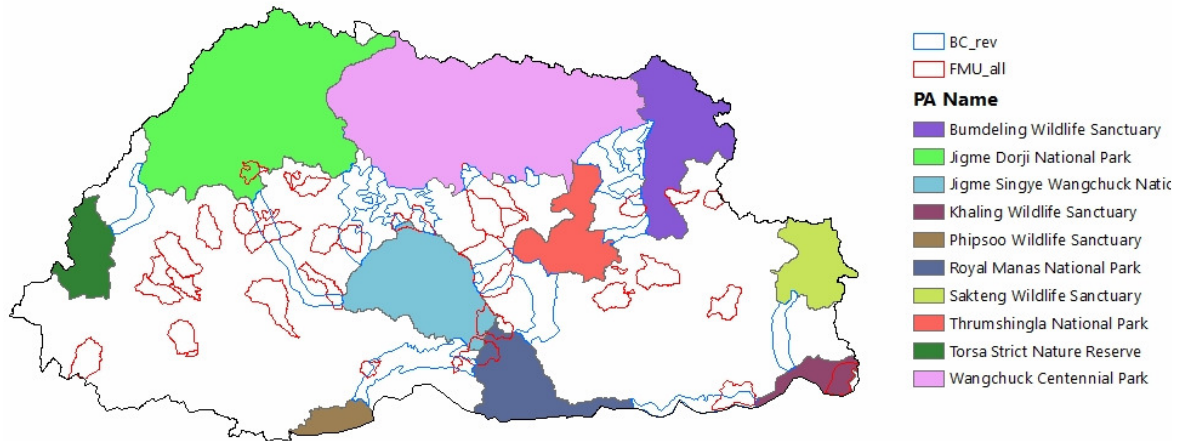
Despite the reduced area it covers, Bhutan's farming land is concentrated in very critical areas-on mountain slopes and along the narrow flat strips of river valleys (fig 3.2). According to MoA, 31% of agriculture occurred on lands with more than 50% slope, where without adequate water and soil conservation measures, loss of physical stability and soil fertility becomes inevitable (RGoB, 2009). Apart from other important natural and human-induced causes of land and water degradation (like inadequate road construction and poor management of irrigation systems), the steep character of the land is the primary cause of intense erosion (ACIAR, 2008)<sup>13</sup>. Ongoing research shows that soil conservation interventions are more effective when concentrated along the river margins (fig. 3.3).

fig 3.2 Canyons in Tesu geog, Wangdue; Punakha valley



<sup>13</sup> ACIAR report states that "The main focus of concern about water quality in Eastern Bhutan is siltation of the hydropower station on the Kuri Chu (at Mongar). At the time of my visit the river at the main crossing near Mongar, 2 km upstream from the power plant, carried a heavy silt load (or, rather, high turbidity) despite this being the end of the dry season when flow would have been derived from base flow and snow and glacial melt, none of which should carry significant silt or nutrients as there is no runoff from erosive rainfall. A nearby tributary was not turbid, as expected. Sediment in the main channel of the Kuri Chu apparently originates from remote catchment areas. ACIAR, 2008 p. 12-13

fig. 3.1 a) Protected areas and forest management units



b) Tourism patters, RGoB 2003

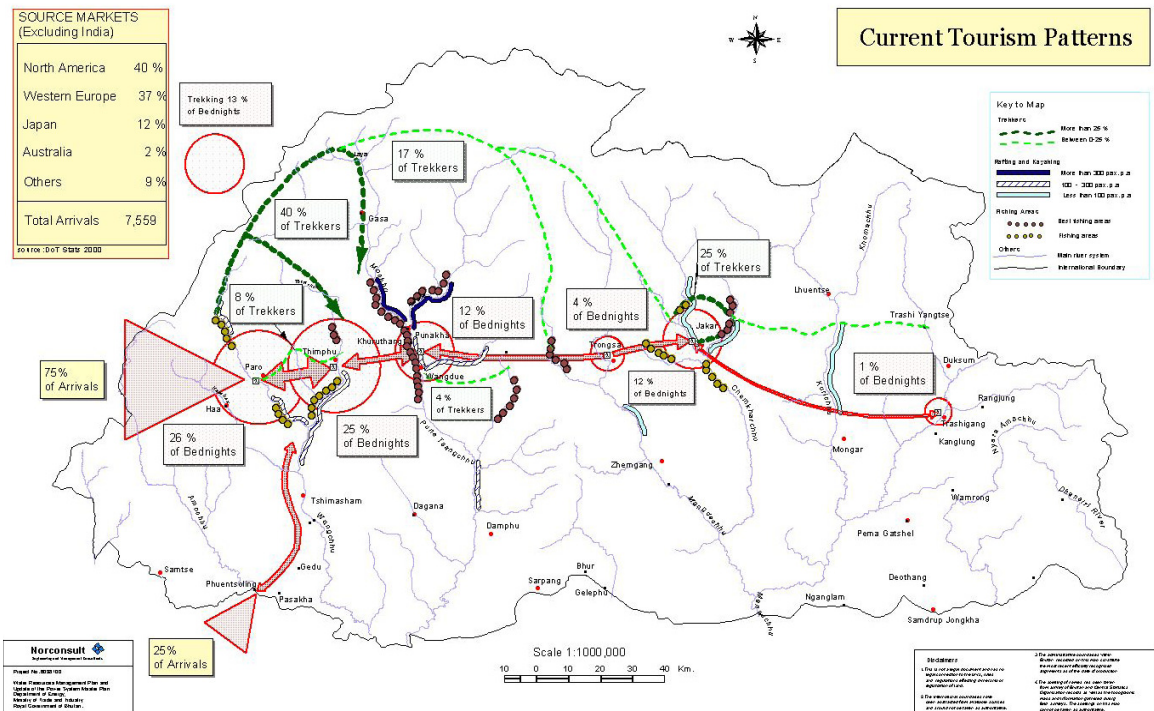
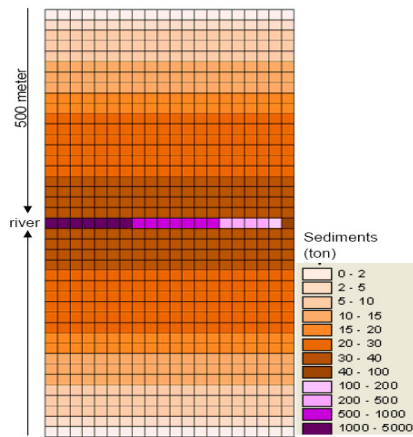
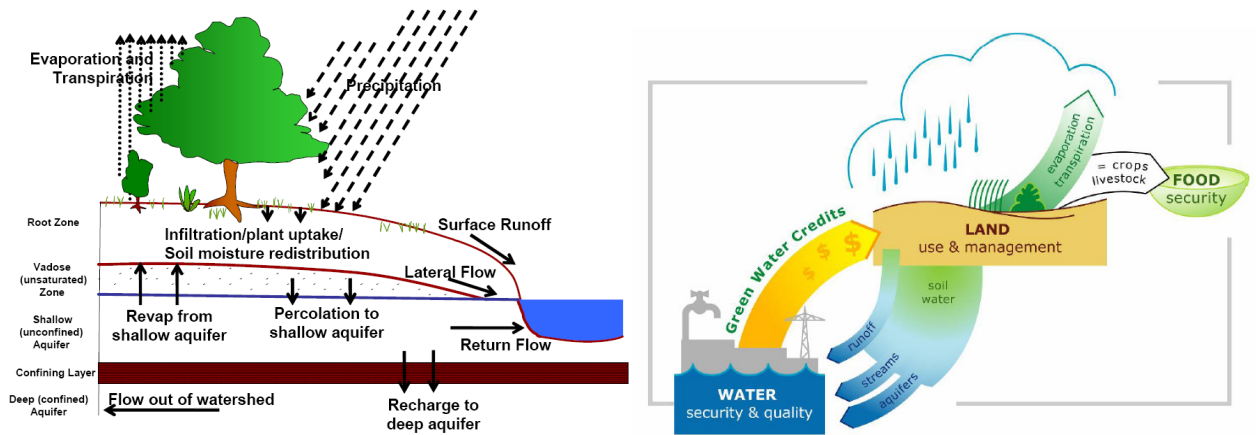
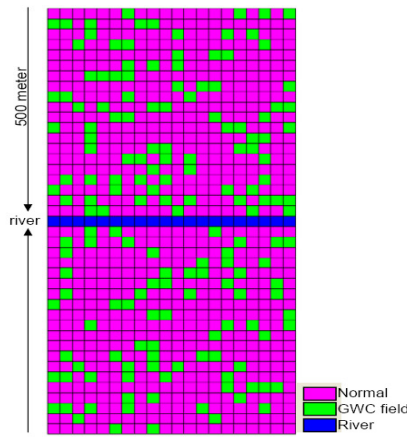


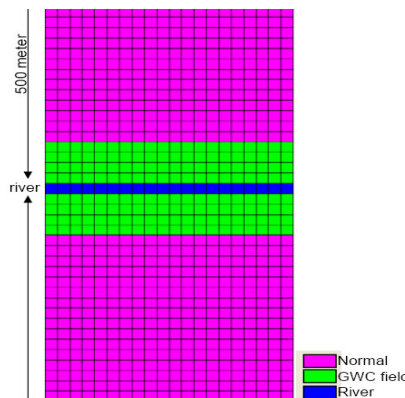
Fig. 3.3 Green water flows and modelling results Klauffman (et al 2007)



Projected erosion without green water management



Projected erosion with random 20% uptake of green water management



Projected erosion with 20% GWC practices implementation, all next to the river

Source: Kauffman et al, 2007

The Bhutan State of the Environment Report (RGoB 2001) highlights the need to encourage farmers to adopt adequate land management options in these lands in order to maintain productivity and reduce degradation. However, investment in these lands is still low compared to investment in infrastructure and agricultural services and forest conservation and expansion, and farmers find it difficult to adopt these measures due to the additional labour requirements and insufficient technical backstopping by agriculture extension services (RGoB, 2009). In addition, free-range grazing in pastures and forestlands may also contribute to destabilizing slopes and increase erosion, especially in the temperate region that are subject to grazing throughout the year – by yaks in winter and cattle in summer – allowing very little for recuperation of grazed areas (RGoB, 2009).

The HP sector is aware of the importance of investing in watershed protection, and is willing to support additional efforts, provided the effectiveness of their investment is clear. While climate change impacts in snow-fed streams are unpredictable, unsustainable practices within forests and alpine meadows (overgrazing, logging) and land degradation in some parts of the country can be dealt with now, and in anticipation of further HP development in those areas. Therefore DGPC would be willing to support sustainable watershed and improved grazing management to reduce these negative impacts, if there is scientific evidence that these activities can translate into improved, or avoid worsening, watershed conditions for HP generation (DGPC MD pers. comm., Oct 2009; RGoB 2009a).

While it is difficult to link benefits downstream to specific interventions upstream scale (FAO, 2003; DFID, 2006), due to the influence of other factors (such as extreme events), it is definitely possible to reduce on-farm erosion, and in this way, limit the amount of sediment discharge from this source. Further research is required to build negotiation support materials to estimate these benefits and investment required. DGPC has noted willingness to contribute with an additional 1% of its royalty energy for watershed management (Bhutan Sustainable Hydropower Policy, draft) to support the government's efforts in specific watershed management activities including "sustainable agriculture/land use practices and nature conservation" however, this is a nominal figure, open to negotiation. In 2008, considering that DGPC (DGPC, 2009) total revenue amounted to Nu 4.3 billion (or USD 92 million), and a royalty of about 15%<sup>14</sup>, as an indication, 1% would mean 6.5M a year, or about Nu 32M (or about USD 690,000) in the same 5-year period. While this amount is considerably low, for a pilot phase and in combination with donor funding, it could be instrumental in demonstrating the need for more meaningful investment.<sup>15</sup>

A trial contribution from the sector has already begun in the Wang watershed, where most of hydropower production capacity is located. Due to the recognition that there is a need to invest in specific watershed management activities, of interest to hydropower generation, Thala HP (6 x 170 MW) has embarked in a PES scheme directly with the DoF. The project has assigned Nu 23 million for a period of 5 years (or a little less than the notional 1% being discussed), for plantation of 50ha a year, in the valleys of the rivers Paro and Thimphu, between 500-1000masl. While this initiative demonstrates willingness to pay for improved watershed management by the HP, it is unclear what water-related environmental service is being fostered by reforestation in these areas. There is however a clear interest in improving landscape values in the area due to the fact that it coincides with the main gateway for tourist entry into the country: the highway Paro-Thimphu<sup>16</sup>.

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<sup>14</sup> "4.6.3 A minimum of twelve percent (12%) of electricity generated shall be made available free of cost to the RGoB as Royalty Energy during the first 12 years of commercial operation of the project and a minimum of eighteen (18%) thereafter till the end of concession period." Draft text, Bhutan Sustainable Hydropower Policy, 2008

<sup>15</sup> The a GEF-WB-DANIDA-RGOB development programme on Sustainable Land Management<sup>15</sup> required an investment of USD 2M or Nu 94M (component 1) to pilot SLM practices in 3 geogs (sub-districts) over 3 years.

<sup>16</sup> In the proposal (RGoB, 2008) it is stated that: "Paro is one of the gateways to Bhutan and almost all the foreign visitors have to travel to the capital and rest of the country through the Paro-Thimphu highway. The vast stretch of areas lying barren and degraded which are visible from the highway is not giving good image to the country. It has therefore become very critical to bring these areas under greenery."

While Bhutan is endowed with high rainfall and water resources per capita are among the highest in the world (FAO, Aquastat), the physical access to permanent water is limited creating water scarcity pockets during the dry period from October until May. Chukka and Thala hydropower plants produce only for internal demand and Mongar town uses 100% of its main water source in that period and still does not provide for all the urban demands. Due to the topography, the options for storage, diversion and channelling infrastructure are constrained.

Investment in land management options that can increase infiltration and increase discharge during the dry season could also have benefits for hydropower and drinking water supply. In the mountains of Eastern Kenya, Klauffman (et al 2007) found that applying green water management techniques (fig 3.3 above) can result in improved water flows and energy generation: "The additional 115million m<sup>3</sup> stream flow that would be generated in a dry year by applying mulch to farmland would generate 460Gigajoules, offering the possibility of holding off commissioning of the proposal Grand Falls dam, downstream of Kiambere". In Bhutan, investment in downstream storage dams is already being planned for the Wang watershed. In addition, regulation of flows obtained through improved soil water storage can also help buffer minor flood event.

Improvements in water availability would also have important impacts in food production. Only 12% of arable land is irrigated mainly in downstream wetlands, thus rainwater harvesting during the raining seasons, soil water conservation practices could substantially increase food production (ACIAR, 2008) in rainfed areas, enabling farmers to overcome seasonal droughts and enhance land productivity with supplementary irrigation<sup>17</sup>. The proposed Water Law states: "63. Harvesting of ground water, rain water, fog and from any other sources shall be encouraged to prevent local and seasonal water scarcity." (RGoB, 2009 draft water law)

→ **Why should Bhutan charge other countries for its carbon storage services?**

Bhutan conservation policy also generates important carbon sequestration and storage services, that already recognized by the global carbon market. Forest conservation is being rewarded by the REDD+ mechanism (paying for Avoided Deforestation and Forest Degradation and enhancement), and improvements in croplands also have a large potential for carbon sequestration- 89% of agriculture's climate change mitigation potential lies in increasing soil carbon pools (Smith et. al. 2007). Under the Agriculture, Forestry and Land Use (AFOLU) voluntary segment, soil carbon credits from agriculture lands are already eligible under certain carbon standards. In addition, improved grassland and livestock management of alpine meadows are soon to become eligible as well, as appropriate methodologies are being developed (see box 3.4) an option that could be also be explore for the pastures in northern Bhutan.

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<sup>17</sup> these measures will need a close monitoring to assess the cumulative impacts of water harvesting development and consecutive increased water use on the sub-catchments on the river base flows that ultimately feed hydropower

#### Box 3.4 Yak herders producing carbon credits from alpine meadows

FAO is developing a carbon accounting methodology for grassland carbon credits in alpine meadow, following AFOLU guidelines from VCS- the lead carbon standard in the voluntary market. A private sector investor has agreed to cover all project design and implementation costs- up to US\$5million, which they will received back in an annual supply of an estimated 40,000 carbon credits, corresponding to as many tonnes of carbon dioxide locked away in soil or methane prevented from being released into the atmosphere by reducing the number of livestock and improving their productivity.

For the community, the project brings long-term support (10-20years) to improve the management of their grasslands and prevent intensely degraded pasture from expanding, leaving the sandy soils underneath blowing in the highland wind. In addition, the project will boost the local micro-enterprise producing Yak yogurt for the capital of the province, 4 hours drive away, due to the increase in milk production and possibly other spin-off products thanks to the special marketing support provided by the investor. Project approval is currently underway by the national authorities and on-the-ground activities will start Spring 2010. More details will be available through our website [www.fao.org/es/esa/pesal](http://www.fao.org/es/esa/pesal)

### — PES can insure against worsening ES provision

Finally, PES has also the potential to act as insurance against worsening conditions. For hydropower the rationale for investment in SLM measures that can increase infiltration might be to avoid future production losses due to water shortages and delaying investment in downstream reservoirs. For the drinking water sector, early investment might help in avoiding higher costs of tapping new water sources, further away from its users. In Bhutan, land degradation and population is higher in the East, but population are growing fast in the few large valleys in the West changing land and water use patterns, increasing the pressure on the limited quality water or land easily accessible. Swift change in watershed conditions may become a concern if appropriate measures aren't taken. For tourism, the rationale for investment lies in the fact that not all land with biodiversity and landscape values can be effectively protected and properly managed with public funds. More decentralized investments will need to be made, and this will only be significant and sustainable when farmers also benefit from the industry. From the point of view of RGoB, this can also be seen as an investment in measures to reduce migration to urban areas, and the concentration of services and infrastructure that requires, including drinking water supply.

### → **Maintaining water flows and controlling soil erosion for hydropower generation**

While we could not determine whether sediment load in rivers feeding hydropower plants is a problem for the sector, personal communication (DGPC MD pers. comm., Oct 2009) and visit to Puna Tsang Chhu Hydropower Plant construction site, indicated that the larger projects are able to mitigate sedimentation under current conditions via inbuilt desiltation chambers. However, in the East of the country, where land degradation is becoming a major problem, sediment loads are reported to cause damage to micro-hydroelectric power plants, whose turbines are more exposed to sediment, and substantially reducing their lifespan.

The task force developing a roadmap for watershed management in Bhutan (RGoB2009a;b) found that generally the watersheds are in good condition (due to the extensive forest protective cover and low population pressure) but “the precautionary principle with respect to watershed condition should be used in planning and implementing land use change; and critical watersheds should be remediate.” Furthermore they also found that “Sound watershed management is required to underpin both strengthening and further growth of Bhutan’s existing economic base and its emerging tourism and hydro-electricity generation industries.” Similarly, the baseline water quality survey and monitoring of Bhutan rivers undertaken by the National Environment Commission and the water resources management plan study by the Department of Energy (RGoB 2003) concluded that at a macro level, the watersheds are generally in good conditions. However, at sub-catchment level and where population pressure is higher, the potential for significant deterioration of watershed conditions has been observed with land

degradation and increased water erosion. There are cases of sub-catchment in critical conditions, such as the Radhi watershed in the East, or the Lingmutey chhu watershed in the centre where interventions have been instrumental in slowing down the watershed degradation (RNR RC Bajothang. 2006, Wangchuck T. 2008).

While the total population of Bhutan is very low (only about 630,000 inhabitants) the proportion of land that is usable is extremely low as well. If we consider the area of the entire territory, population density would be 17 hab/km<sup>2</sup>. However, since most of Bhutan's population is rural (80%), considering cultivated area as only, population density jumps to 470 hab/km<sup>2</sup>. Further expansion of agriculture land is limited by conservation policies and steep topography; pressure on the usable land is high, especially in the east of the country, where land degradation is advancing rapidly (RGoB. 2009).

→ **Preserving drinking water supply**

Largely because of the increasing migration from rural to urban areas, cities in Bhutan are expanding at an accelerated pace. Between 2000 and 2005, the estimated annual average growth of urban population in Bhutan was 7.3 percent, with 111,770 people (out of a total population of 634,982) migrating from rural areas to urban settlements in 2005. Thimphu city, the capital, is growing 10% a year and this rapid urban growth has already created pressures on services like drinking water, sanitation and waste disposal. Overall, about 30.9 % of the population (or 196,111 inhabitants) are today living in urban areas-this ratio may reach 50 to 75 % of the total population in 2020 following the current growth in 2020<sup>18</sup> (RGoB, 2007; RGoB, 2006).

Cities are poorly equipped to deal with such a fast population influx and municipalities are already facing constraints in water and sanitation systems. While basic urban facilities exist in all the towns, they are inadequate for their new population and they require improvement and expansion. Piped drinking water has been provided to many towns but is still insufficient reaching only 22.7 % of households, while 61.5 % of the households still only have piped water outside the house, and 14.3% are served by springs, rivers or ponds (RGoB,2006). Sanitation and wastewater treatment lag behind. Sewage lines and treatment facilities are in place only in two towns, Thimphu and Phuentsholing. Thimphu city development strategy (draft for discussion) indicates that in fact only 12% of the city is connected to the wastewater treatment plant and high levels of raw sewage and domestic wastewater flowing in the storm drains and rivers.

RGoB (2003) estimated that municipal, rural and livestock demands are of equal order of magnitude and make up about 10% of the total consumptive water demands in Bhutan. It forecasted a fast increase of municipal demands that may triple in 2022 reaching a 37 hm<sup>3</sup>/year (in 2002, municipal water use represented only 10 millions m<sup>3</sup>). Although water balance issues are not critical on a gross national scale in Bhutan, the picture may be different as one move to sub-basin levels or further down into smaller sub-catchments with heavy population concentration, or limited easily accessible water resources. Competition over easily accessible quality resources may arise in some areas. In most of the cases, the main rivers are not used for drinking water purposes yet.

Current urban water supply infrastructure were designed for smaller urban population and are already finding difficult to supply the 145l/person/day requirements (Mongar municipality water supply engineer pers. comm.) particularly during the dry season from October to March. In some areas, like Mongar City in the East, the inadequate water supply forces authorities to limit supply, and the future supply for the anticipated doubling of its population in 10 years is a growing concern. Thimphu has already begun exploring new water supply sources as well (Thimphu municipality. pers. comm.).

<sup>18</sup> Bhutan National Urbanization Strategy (Draft for discussion), Ministry of Works and Human Settlement; Bhutan Observer, The urbanisation dilemma, 5 November 2009 <http://www.bhutanobserver.bt/2009/featured-stories/11/the-urbanisation-dilemma.html>

The current draft water law (NEC, 2009) has made provisions for charges and other fees collected for water use are invested back into the upkeep of supply infrastructure and management of the watersheds where the water originates. The water policy (2007) suggests options for investment in rainwater harvesting as a means to help overcome water scarcity.

### 3.2. WEAKNESSES

#### — Unclear RGoB willingness to engage in participatory management

While PES can act as a channel for benefit-sharing, if this is the main goal of RGoB, command-and-control measures might be more effective (such as raising the royalties paid or creating new environmental taxes). However, from the point of view of the sectors in question, they might be more interested in supporting a flexible mechanism like PES, that can give them the chance to influence more directly in which activities, and where, these funds would be invested. As a mechanism to improve NRM and associated environmental service provision, PES will rely on rural communities to implement and maintain certain practices. This is an approach that requires devolving substantial NRM responsibility to farmers, and equally important investments in their capacity to do so, in the short term, but that can reduce recurrent government spending in the long run. PES risk management functions will depend on the balance that RGoB finds between strict protection of important environmental assets (such as priority zones with sub-catchments or important landscape niches) and sharing of NRM responsibility in less critical areas.

Supporting rural entrepreneurship, based on the sustainable use of these resources can also give communities the opportunity to realize the value of these services for themselves, thus creating an internal incentive for their appropriate management. The Draft water Law (NEC, 2009) defines critical watershed as “any area critical for protecting the supply of water for drinking, irrigation, flood control, hydroelectric projects or related purposes (...) a “Critical Watershed” is a Protected Area for the conservation of soil and water and related purposes.” The same law also admits expropriation “to protect and conserve watersheds located above drinking water intakes”. PES may act as a positive mechanism to achieve these conservation goals with lower social costs, by allowing communities to continue using the land under certain compensation for restrictions or incentives for good practice.

#### — Lack of urgent demand for improved ES delivery

At present, neither hydropower, nor tourism consider that there is an urgent need to improve environmental conditions- extensive forest cover ensures maintenance of good watershed functions and scenic beauty. However, these conditions will change, as rural populations demand for opportunities to improve their livelihoods, or migrate to the urban areas. In addition, in there are already references to specific and localized problems, where demand for improvements may be immediate, and these sectors know about these problems better than anyone. It's in their interest to identify the problems and engage in a participatory process to address them- PES can be an appropriate channel for this. The drinking water sector does state a clear concern with water supply, especially during the dry season, but it is unclear whether the problem lies in changes in the regulating environmental services provided by watersheds, or in rapidly growing water use and inadequate wastewater management, forcing supply to rely on a limited number of springs. Seasonality, conflicting water rights, lack of appropriate distribution infrastructure may be the main causes and if so PES assist, but it won't be a strong enough mechanism to address these problems on its own.



### 3.3. OPPORTUNITIES

#### — Conducive Policies and Laws

There is political will and enabling laws and policies currently under revision which include specific references to PES as a mechanism for benefit-sharing and more decentralized investment in NRM. The Ministry of Agriculture is particularly interested in exploring this potential, and so are several of the cooperation agencies active in the country, including Danida.

At present, three major PES-enabling laws and policies are being discussed, two of which have already specific provisions for establishing PES: The Water Law and the Sustainable Hydropower Development Policy. Following the intention stated in the Water Policy (2007), the current draft of the National **Water Law** (draft September 2009) specifically predicts the establishment of PES as one of the main sources of revenue for watershed management (box 3.5). It also creates important integrated water management body (the Water Authority) and river basin commissions, all of which would greatly facilitate PES development, especially by coordinating water users within a watershed unit. The proposed **Forest Law** includes similar institutional arrangements, with the creation of a committee to enable RNR cross-sectoral activities such as PES. The draft National **Forest Policy** (September 2009) specifically mentions PES as a mean to cover the costs of maintaining and improving watershed services. In line with this, Bhutan's Sustainable Hydropower Development Policy (draft of June 2008) already states the intention of the hydropower sector to support specific watershed management activities (box 3.5). Answering to this interest in an integrated management of water and forest resources, the watershed management roadmap of Bhutan (RGoB, 2009a) proposes a strategic level planning that implies the adoption of a basin-wide planning approach and the assessment of watershed conditions across the country, to identify critical areas of critical sub-catchment for priority attention.

The Tourism Bill of Bhutan 2009 (draft G, 7 July 2009), refers to compensation or incentives for maintenance of landscape values and to support more meaningful participation of rural communities in future tourism development. PES can help capture local tourism revenues to invest in specific technical and financial support for rural communities to develop and manage local tourism ventures, coupled with protection of the landscape characteristics of importance to tourism activity. The Nature Conservation Division (DoF, MoA) is also moving in this direction and is preparing a Framework for nature-based with the dual goals of (i) using tourism revenues to complement and support the conservation initiatives of Bhutan and (ii) open up Bhutan's natural areas for tourism with the intention of empowerment and economic development of communities in remote natural areas. It contemplates the option of charging entrance fees to protected areas as a means of financing local sustainable development and conservation, and the diversification of tourism product and service range, to increase in tourism numbers and revenues for the country<sup>19</sup>.

Finally, other laws allow for underlying conditions such as polluter-pay principle (National Environment Protection Act, 2007), community-based conservation and stewardship (Forest and Nature Conservation Act, 1995; Land Act, 2007) and community participation in development and environment (Local Governance Act, 2009), and decentralized discretionary fund allocation. RGOB is increasingly moving towards a growing decentralization of natural resources management engaging local authorities and rural communities, in line with an ongoing transition towards a more decentralized governance structure, which has been initiated as part of the government reform process.

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<sup>19</sup> The first draft of the framework was presented in early January at a National Level Consultative Workshop organised by the Ugyen Wangchuck Institute for Conservation and Environment (UWICE) in close collaboration with the Nature Conservation Division (NCD) of the Department of Forest and Thrumshingla National Park. Source: news release at MoA website: [http://www.moa.gov.bt/moa/news/news\\_detail.php?id=992](http://www.moa.gov.bt/moa/news/news_detail.php?id=992)

<p>Box 3.5 PES enabling policy and legislation in Bhutan</p>
<p><i>Bhutan Water Policy 2007</i></p> <p>6.3 Value of Water 6.3.2 Economic tools for promoting preferred or environmentally beneficial practices shall be promoted.</p> <p>6.4 Water Resources Protection 6.4.2 Watersheds play an important role in regulating and maintaining water flow. The Royal Government of Bhutan shall ensure that adequate funds and resources are ploughed back for watershed protection and management. The plough back mechanism shall be used as an important tool for water resources management and development.</p>
<p><i>National Water Act, draft September 2009</i></p> <p>75. Payment for Watershed Services (1) Authority shall promote payment for the environmental services provided by a water resource, such that the cost of conserving water resources in the upper watershed areas through the adoption of appropriate land use practices, resulting in protection from erosion and sedimentation, and stream flow stabilization, are borne by downstream users of the resource.</p> <p>(2) Authority shall ensure that the revenue collected from payments made for environmental services is earmarked for the promotion of integrated water resources management practices, and for conservation activities aimed at improving the conditions of the upper watershed areas.</p> <p>(3) Payment for environmental services shall be implemented through Regulations under this Act, which shall include appropriate institutional arrangements to administer the funds. “</p>
<p><i>Tourism Bill of Bhutan 2009 (draft G, 7 July 2009)</i></p> <p>8: Powers of the TCB 8 i) designate, under Regulations issued by it, specified areas as tourism development areas, tourism circuits, tourism zones, tourism sites or tourism villages and such areas, circuits, zones, sites and villages shall be subject to the planning restrictions and eligible for financial incentives specified in the Regulations;</p> <p>11: Council of Dzongkhag Tourism Officers (1) Each Dzongkhag shall have the power, in consultation with the Director General of the TCBS, to appoint a Dzongkhag Tourism Officer, when it is deemed appropriate. (3) The Dzongkhag Tourism Officer shall: c) participate in the homologation of the tourism circuits in conformity with the tourism development programmes; e) constitute and manage extra-budgetary funds for the promotion and development of tourism; g) create employment opportunities in the tourism sector for local people</p> <p>19: Sustainable Development of Tourism 19. 2 e) information, education, motivation and involvement of the local population in the process of tourism facility development 19.2 g) involvement of the local population in the formulation of collaborative programmes designed to optimise tourism implementation</p>
<p><i>Bhutan Sustainable Hydropower Development Policy 2008</i></p> <p>Integrated Sustainable Water Resources Management “12.4 In order to utilize water resources in a sustainable manner for hydropower generation, it is important to protect water catchment areas by promoting sustainable agricultural/land use practices and nature conservation works. The MoA in collaboration with MoEA shall work out the modalities for integrated sustainable water resources management. A minimum of 1% of royalty energy in cash shall be made available on annual basis to MoA for this purpose.”</p>

## — Enabling Institutional Environment

The newly created **Watershed Management Division (WMD)**, within the Department of Forest, MoA, has the mandate to support sustainable management watersheds, starting with the most critical sub-catchments for protecting the supply of water for drinking, irrigation, flood control, hydroelectric projects or related purposes (draft water law of 2009). The National Forest Conference 2009 resolved that “different ongoing programmes of Department should be

synchronized with the goals and objectives of the Watershed Management Division during its organizational development<sup>20</sup>, therefore the timing is right to incorporate PES into WMD and other MoA planning in order to ensure long-term and meaningful institutional cooperation within MoA. The programme for watershed management in Bhutan (RGoB, 2009b) suggests exploring PES schemes: "These WSM activities at their simplest may involve avoiding a particular adverse WSM activity (such as overgrazing) by paying farmers their income foregone if they do not overgraze. In many instances however, the potential exists to design WSM activities that provide a win-win outcome whereby the farmer can, with assistance in investment in new agronomic techniques or livestock genetics for example, continue grazing at some level potentially with increased productivity and the service purchaser can secure the desired environmental outcome."

The Social Forest Department already facilitates communities to make use of forest, with sustainability requirements, is in fact already compensating communities for their stewardship role over forest resources and environmental services. Other MoA departments also manage compensation schemes help farmers overcome losses from wildlife damage to crops and livestock.

Other NRM actors in the country have with technical capacity to implement required SLM interventions and capacity-building, and have explicit interest in PES. The network of RNR research centres<sup>21</sup>, have wide experience in production techniques that could improve land and water management, and help overcome less favourable conditions of geography, water availability and seasonality to improve farm productivity. Several donor agencies have staff embedded in various government agencies, and have demonstrated an interest in PES development in their own work programmes.

The National Soil Services Centre (NSSC) has analytical expertise on soil fertility and implementation capacity through the GEF-WB-DANIDA project on Sustainable Land Management<sup>22</sup> (see 3.6). In the context of the National Action Plan to Combat Land Degradation (RGoB, 2009) the centre is searching for sustainable financing mechanisms -PES being one of them- to increase investment in SLM for steep slope agriculture and improved grazing management. SNV<sup>23</sup> has also an ongoing interest in developing PES mechanisms (Wangchuck, T. forthcoming). It has seconded PES expert staff to WMD to support the development of these mechanisms, and has good technical staff integration with Tourism Council of Bhutan (TCB), and the Nature Conservation Division (NCD) and could help mainstream the concept of tourism-based PES schemes for biodiversity conservation and landscape management. The NCD (DoF, MoA) and the Royal Society for the Protection of Nature, managing the Phobjikha Conservation Area, have the technical capacity to carry out biodiversity conservation activities, and an interest in developing sustainable financing mechanisms for these activities. In the region, ICIMOD- International Centre for Integrated Mountain Development, has a work programme on Environmental Change and Ecosystem Services and leads regional capacity building on soil and water conservation<sup>24</sup>, integrated watershed management and PES development<sup>25</sup>.

**At the local level**, representatives of these agencies and extension officers (district Forestry, Agriculture and Livestock officers, and extension staff in the sub-districts), could facilitate community planning of PES eligible activities. At the local level, PES planning and support

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<sup>20</sup> DoF website, news section: <http://www.dof.gov.bt/node/7>

<sup>21</sup> RNR centres are located at Yusipang (Thimphu), Bajo (Wangdue), Jakar (Bumthang) and Wengkhari (Mongar). Their research programs focus on forestry, field crops, livestock development, horticulture, plant protection, soil and soil fertility, water management, and farming systems.

<sup>22</sup> For more information on the SLM Project visit <http://www.moa.gov.bt/nssc/projects/slmp.php>

<sup>23</sup> The Netherlands development organisation

<sup>24</sup> An upcoming opportunity is the Fourth International Training Course on Low-cost Soil and Water Conservation Techniques and Watershed Management Activities, 15 March - 6 April 2010 at Godavari, Kathmandu, Nepal. <http://www.icimod.org/?page=639>

<sup>25</sup> Programme on Livelihoods and Ecosystem Services in the Himalayas: Enhancing Adaptation Capacity and Resilience of the Poor to Climate and Socio-Economic Changes <http://www.ifad.org/operations/projects/regions/Pl/grants/index.htm>

teams may be composed of the local representatives: Tshogpas (chiog/village head) and Gup (geog/village blocks head), existing groups such as community forest committees (e.g. in Yahpogang CF committee in Mongar goeg) and local development associations or cooperatives (eg. the women's association in Phobjikha or the valley's environmental management committee).

Box 3.6 PES Synergies with GEF Sustainable Land Management Project (2006-2012)

- PES has been identified in IFS as a source of funding for SLM actions as described in the NAP.
- Conversion of ex-tseri to sustainable kamzhing is a main activity in all 9 SLMP geogs and could be rolled out to more geogs under the PES scheme. Suggestions included the Geogs Shongphu and Kangpara, in Trashigang and bordering a SLMP geog, Thrimshing. It comprises of a critical watershed of the Nye Amer river that drains the highlands of Merak-Sakten and runs through Kangpara.
- C-sequestration by increasing soil organic matter and improved grazing management in highlands could also be linked to PES
- Strong parallel between SLM and watershed management. Ultimately the hydrological benefits of land sustainability, beyond food security, are also for hydropower- limit runoff and sediment load in rivers downstream;
- A growing concern is fallow land. If these fallow areas could be converted to productive and sustainable land (eg. through orchard development, bamboo plantation, CF development, terracing) it would contribute to food security and make the land more valuable if PES could be linked with this process of fostering the transition from fallow to sustainably productive
- The methodology developed by SLMP for community participatory action plan could be valuable for PES planning and monitoring; the same applies to the NR maps developed at chiog level that would allow to identify priority areas for PES incentives (eg. fallow lands, ex-tseri etc)

source: NSSC director, pers. com. on 07/10/2009

### 3.4. THREATS

#### — PES enabling policies fail to be implemented

While in the above mentioned laws and policies, PES is mentioned specifically as a mechanism to improve natural resources management and rural development, these laws are currently undergoing approval, and may still change. The most crucial being the Sustainable Hydropower Policy where hydropower is somewhat committing to make more significant investments in watershed management. The water policy and forthcoming act are also critical in getting water resources effectively into the natural resources management agendas.

#### — Suitable institution arrangements fail to assist collaborative action

PES requires the alignment of policies and investments in a multi-sectoral approach. An appropriate institutional framework will be required to support the consultative process underpinning design decisions and supporting effective technical assistance during implementation and monitoring and evaluation. Today, coordination mechanisms for water use and development are not in place. Its unclear how much of this role would the National Environment Commission (NEC) be willing to play, and whether its

#### — External factors can undermine PES benefits

At present, it is not clear where and how serious is the water scarcity, or quality (e.g. sedimentation) problem for specific water users. Prior to designing any PES mechanism, further research will need to be conducted and existing studies reviewed to understand (i) how serious is the problem and (ii) what are the causes, including distinguishing human from natural causes, in order (iii) to identify cost-effective mitigation measures, at an appropriate scale, and associated (iv) monitoring and reporting methods.

Related to sedimentation issue, a major question is to what extent human activities do influence sediment load in rivers, considering the limited farming land area. However, as discussed above, it's important to understand the critical influence these lands may have in sediment

discharge as well as other farming activities more widespread through forests and pasturelands, especially free-range grazing and over-grazing.

While PES has the potential to support integrated NRM options, its efforts may be undermined if the required regulations and “command and control” options are not in place, or not enforced adequately. Road building and inadequate maintenance of irrigation channels are appointed as major causes of erosion (ACIAR, 2008) RGoB has developed a cost-effective environmental code of practice<sup>26</sup> for the design, construction and maintenance of roads, but this has not been able to adequately implement these practices due to constraints in budget and trained human resources (RGoB, 2009). If this situation fails to be addressed, any benefits stemming from payments for reduced erosion in farming lands may be undermined.

The same applies to situations where efforts to increase water availability during the dry season may be masked by unclear and unfair water use rights, or inadequate wastewater management, polluting resources that would otherwise be available. Similarly, if water demand management and adequate supply infrastructure are not addressed, investment in land management options to increase aquifer recharge and stream flow regulation may not yield visible benefits to water users. In these cases, PES may only act as an additional, flexible, instrument to encourage positive action, but it cannot address these problems on its own. Several of these issues were raised during the consultations for this assessment that may not link directly with PES, but where PES could act as an incentive to improve environmental management.

Investments in techniques that increase water retention and reduce soil loss, are also expected to have positive impacts in terms of increased production and food security. However, at a macro scale, these investments could be undermined by planning decisions allowing urban development into prime agricultural land, such as the flat areas along river valleys and floodplains, leading to loss of prime farmland<sup>27</sup> as in Thimphu, Paro, or new towns as Wangdue resettlement on paddy areas (fig 3.4). At the same time, this same approach may undermine any efforts to improve watershed water retention capacity as a means to reduce flood risk (FAO, 2003).

Fig.3.4 The new town of Wangdue



<sup>26</sup> Preliminary study done by the SNV/ World Bank EFRC support project in 2004 revealed that initial cost of building roads using EFRC approach and techniques would be around 30-35 percent higher than building roads using traditional approach and techniques. However, the overall cost difference between EFRC roads and traditional road would balance out after 7-9 years and over the long term EFRC roads are expected to be significantly less expensive than traditional roads as a result of lower recurrent maintenance costs.

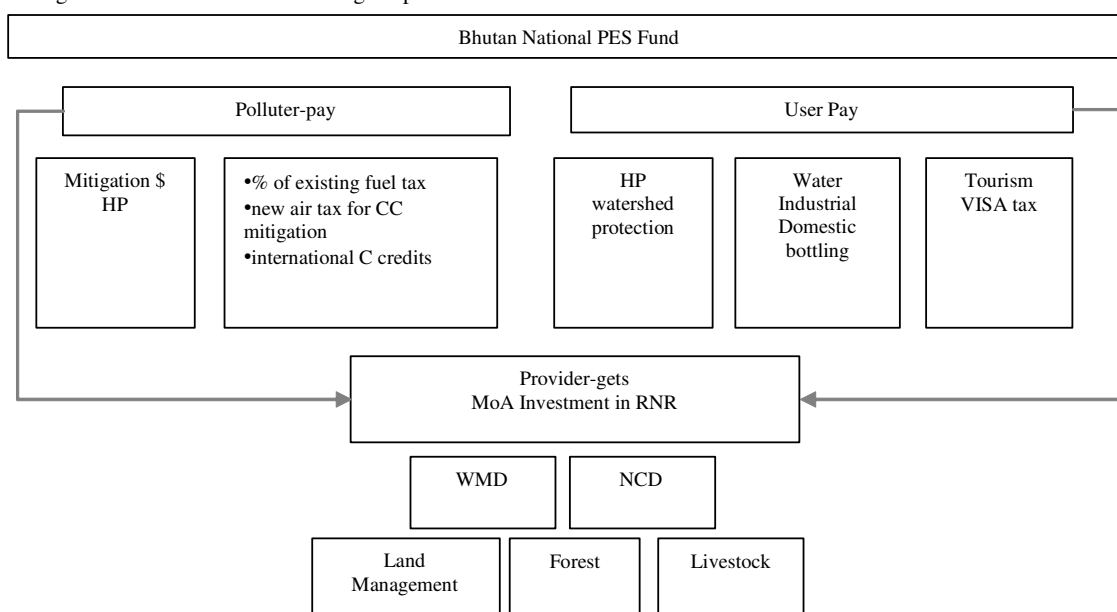
<sup>27</sup> Farming land, the source of livelihood of 69% of Bhutan’s population, is concentrated in only about 8% of the land “Because of our mission to maintain 60 % of forest cover, we have very little room to expand our arable land. Due to the infrastructure development program in the country such as town planning, we continue losing the arable land” [http://www.moa.gov.bt/moa/news/news\\_detail.php?id=102](http://www.moa.gov.bt/moa/news/news_detail.php?id=102)

#### 4. Recommendations for PES in Bhutan

Based on the SWOT analysis above, we conclude that there is sufficient interest in pursuing PES as a mechanism to help share the costs of natural resources conservation, and the need to further investigate the extent to which PES could improve the delivery of environmental services, for which there is, or would be demand in the near future. While it is not clear that RGoB would be willing to devolve this much NRM responsibility, and allocate the required resources to local communities to on this role, hydropower, tourism and drinking water supply sectors may be willing to test this approach, as a mechanism to either anticipate future stronger regulations or to influence its design. Similarly, to companies entering into the voluntary carbon market as a way of preparing for upcoming mandatory emission reduction, these sectors could participate in the scheme to have the chance of influencing the design of the eventual future mandatory scheme, and its investment priorities. If these sectors would be willing to co-finance a trial phase, there is certainly substantial interest in PES from a variety of RGoB departments and development partners, within the country and in the region, that could support it as well. Given the conditions discussed above and the overall environmental focus of Bhutanese development policies and the centralized structure of Bhutan’s environmental management decisions, this preliminary assessment confirms that the creation of an Environmental Services National Programme would be feasible. A national scheme would allow for collecting funds from the main ES users through non-voluntary environmental management fees where investment would be strictly earmarked for activities of interest for the contributing sectors.

Such a programme could be funded (i) pooling polluter-pay funds committed for mitigation of negative environmental impacts and (ii) user pay contributions to enhance environmental conditions. Investment would be channelled by MoA to land managers in a position to improve provision of environmental services (provider-gets) (fig 4.1). Similar national schemes exist elsewhere that can provide valuable lessons (box 4.1). Just as an illustration of what could be developed at a later stage, the Environmental Services fee could be passed along to the end user (eg. through water use fees) as much as possible, and collected through existing channels. This would make collection of contributions easier, lighter and more accountable. Such fees could be collected through adding a: (i) variable watershed management fee to existing water use and electricity bills, or royalties, (ii) biodiversity conservation/landscape management fee payment to all tourism entries, added to entry Visa charges, or to tariff package price, then transferred through the existing royalty, and (iii) - fix carbon storage fee to all arrivals by air, regardless of their purpose.

Fig. 4.1 Possible sources of funding for potential PES national scheme



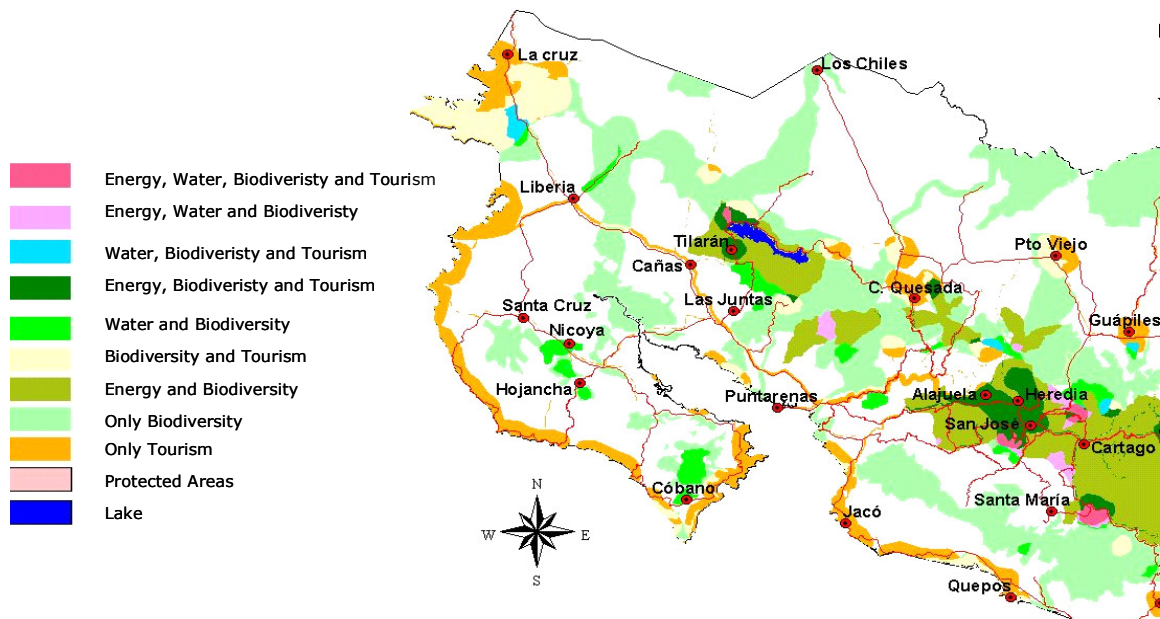
**Box 4.1 Costa Rican National PES programme: sources of funding and investment priorities**

**Sources of Funds**

- 3,5% from revenues from fuel tax
- other revenue from the forest tax
- 25% of revenue from water fees  
(additional 25% go to the National System of Conservation Areas)
- Private, voluntary contributions from HP and water bottling companies
- Sale of ES certificates
- WB Loan

Cooperation projects (KfW) earmarked for a specific area (Huetar Norte)

**Activities and areas eligible for PES**



- Conservation and protection of existing ecosystems. Over 80% of payments go towards conservation.
- Reforestation for commercial plantations .
- Improved management practices through agro-forestry projects (which may also include shade coffee, afforestation of pasture lands, live hedges providing fodder, or as wind brake barriers). These projects were introduced in 2003 as part of the second generation PES, with the aim of including the environmental services provided by agricultural activities in the PES compensation scheme. An additional aim was to contribute to rural poverty alleviation by providing an alternative source of income for farmers.
- Rehabilitation of degraded ecosystems for conservation
- natural regeneration of the "Kyoto Lands" Sustainable Forest Management (No new contracts since 2002).

*Priority criteria vary according to the type of project. All these priorities are overlaid on a Geographical Information System (GIS) database which allows FONAFIFO to identify areas of highest priority. Within those priority areas, in-coming applications are dealt on a "first-come-first-served" basis.*

**A) Projects for Protection:**

- areas located in biological corridors (SINAC) especially those considered of high priority by the ecomarkets project (GEF);
- areas within the influence area of the Huetar Norte Forestry project (KfW);
- renovation of previously existing contracts, as long as they are located within the above mentioned priority areas;
- forest areas located in strategic areas for the protection of water resources of interest for rural aqueducts, national or municipal utilities;
- privately owned areas, within the protected areas, that have not been acquired or expropriated by the State;
- Projects located in areas where the Social Development Index is under 40% (a relative index combining educational, health indicators with social indicators e.g. number of single mother births and electricity consumption, where 0% is the poorest area and 100% the best in Costa Rica (Ortiz et al 2003).

*B) Reforestation projects:*

- Land use aptitude for forest plantations;
- Location in relation to:
  - i) Conservation District in which the project is located; however, in the case of reforestation with native or endangered species, or natural regeneration, this does not apply, as the entire country is prioritised;
  - ii) donor target areas (Huetar Norte Forestry Project-KfW);
- renovation of previously existing contracts;
- Projects located in areas where the Social Development Index is under 40% .

*C) Agroforestry*

- Projects submitted by organizations or individuals with certified capacity in managing 'forest'/timber trees in agroforestry regimes;
- land use aptitude for forestry;
- areas of high risk of soil or water degradation and biodiversity loss.

*D) Natural generation* (beginning in 2006) in "Kyoto lands" - areas that were deforested before 1986 and that can now be left for natural regeneration: payment is US\$41/ha/year over 5 years

Sources:

Figure : adapted from Map "Servicios Ambientales, 2001 Fuente: ICE, 2000; Lucke y Ramírez, 1980; ICT 2000; MINAE, 2000" Sistema de Información de Recursos Forestales (SIReFOR)

Full map available at [http://sirefor.go.cr/Bosques/cobertura\\_forestal/mapas/servicios%20ambientales.jpg](http://sirefor.go.cr/Bosques/cobertura_forestal/mapas/servicios%20ambientales.jpg)

Fonafifo website [http://www.fonafifo.com/paginas\\_espanol/fonafifo/e\\_fo\\_acerca.htm](http://www.fonafifo.com/paginas_espanol/fonafifo/e_fo_acerca.htm)

[http://www.watershedmarkets.org/casestudies/Costa\\_Rica\\_National\\_PES\\_eng.html](http://www.watershedmarkets.org/casestudies/Costa_Rica_National_PES_eng.html)

[http://historico.gaceta.go.cr/pub/2006/01/30/COMP\\_30\\_01\\_2006.html](http://historico.gaceta.go.cr/pub/2006/01/30/COMP_30_01_2006.html)

La Gaceta N° 21 N° 32868-MINAE - Canon por concepto de aprovechamiento de aguas

#### Box 4.2 Bhutan Trust Fund for the Environment

The trust fund is an independent grant-making organization that uses its annual investment income to finance conservation activities. Grants are awarded to eligible Bhutanese individuals and institutions based on any of the following objectives, up to 300,000USD,

Support in-situ and ex-situ conservation initiatives in the entire green sector, including sustainable utilization of genetic and species resources. Broad activities eligible for funding include:

- » Capacity building for integrated conservation and development in protected areas with management plans.
- » Conservation planning and infrastructure building for parks yet to be brought under scientific management.
- » Enhancing central government capability to provide specialized support to protected area management.
- » Protecting and/or restoring the biophysical environment from natural and anthropogenic threats.
- » Sustainable forest management planning and agro-biodiversity conservation.

Strengthen integrated conservation and development planning through applied conservation research and monitoring of biodiversity change. Broad activities eligible for funding include:

- » Capacity building for socioeconomic assessments, biodiversity inventories, and development and conservation research.
- » Promoting central government capability for organizing, storing, analyzing and providing access to conservation information.
- » Assessing and monitoring biological change in protected areas and national forests, consistent with the Biodiversity Action Plan of 1998.

Promoting conservation education and awareness of conservation policies and issues. Broad activities eligible for funding include:

- » Non-formal conservation awareness programs.
- » Integrating environmental education into the national education curriculum and strengthening human capacity for conservation education.
- » Developing resource materials and teaching aids on Bhutan's natural heritage.
- » Involving religious communities in promoting conservation values and ethics.
- » Building awareness of conservation legislation, public policy and regulations.

BTF website: <http://www.bhutantrustfund.bt/about-bhutan-trust-fund/what-we-do>



This centrally charged fee could cover activities in areas where at the moment there is no direct or enough demand. For example allowing investment in areas where wildlife damage to crops and livestock is critical and there are not tourism-related activities (as in the south of the country) that can compensate farmers for these costs<sup>28</sup>. However, the creation of such a system would be a long-term process that would require extensive consultation and economic analysis to determine the level of fees and the most efficient way to manage the funds. Where these centrally collected funds could be housed would be a matter of discussion for RGoB, but a promising candidate seems to be the Bhutan Trust Fund for Environment, under a parallel funding stream, as BTF's mission statement mirrors the focus of PES activities promoted under an umbrella scheme such as the one proposed here (box 4.2).

Considering this long-term goal, a strong RGoB endorsed PES Forum, with broad-based representation from the private sector and civil society, would be required to legitimize wider charging mechanisms and investment priorities and to facilitate meaningful participation of all sectors, especially those investing. This Forum would also (i) ensure that the programmatic direction of the PES programmes, within different departments of MoA, are consistent with the country Land, Water, Forest, Rural Development, Tourism and FS&N related policies and with the priorities of users, (ii) enforce Monitoring, Reporting and Verification commitments and (iii) approve the PES framework for collection and investment.

#### **4.1. Demonstrating feasibility –pilot site selection**

As demonstrated above, there are many arguments that support PES development in Bhutan. However, there is a need to take a stepwise approach with a limited number of pilot sites suggested acting as a learning laboratory to test and demonstrate feasibility on the ground, identify appropriate selection criteria and the mechanisms to set priorities, but also explore the potential for bundling services, and the conditions for it. Prior to designing a national PES framework, there is an intermediary stage to inform the upscaling stage. It focuses on designing PES selection criteria and a weighing mechanism for priority setting that is tailored to the country realities. The conceptual approach for the pilots conforms to that step. The first criteria for pilot site selection was the presence of a “buyer” that can be charged for the environmental service delivery. Other criteria to assess the suitability of the sites for PES development, and thus guide site selection are described Box 4.3.

Many areas considered critical for key environmental services were highlighted as having a PES potential by the experts gathered at the feasibility workshops, or met during the consultation period. The pilot sites proposed below were identified as the most suitable to testing PES mechanism in Bhutan after a consultation process in Thimphu (during the feasibility workshop, and discussions with multiple stakeholders) and targeted field visits were conducted in the sites with the greatest potential. The field visit enabled to complete the understanding of the sites by getting the perspective from the local communities who would be the target service providers. For more details on the methodology used for local consultations and pilot site selection see Annex 2. Findings of field consultation.

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<sup>28</sup> see recommendations in the Bhutan National Human- Wildlife Conflict Management Strategy (RGoB, 2008a)

#### Box 4.3 assessing the suitability of sites to be used in the PES piloting phase

The following questions were considered in the analysis of the potential of different sites for piloting PES mechanism during a testing phase.

- Strengths for testing PES mechanisms
  - Is there is demand for improved ES, effective and demonstrated or underlying (ie. reliance on these ES)?
  - Are there policies and institutions that could support this?
  - Does that fit with existing work in the area?
  - Is it it replicable in other areas?
  - Is there a potential for engaging ES services providers -land users willing to engage- in maintaining or enhancing environmental services?
  - Are there ES beneficiaries –able to pay- “potential buyers”?
  - Does it have the ability to illustrate different types of Environmental services and bundling of different services and buyers (HP, tourism, drinking water users) but involving the same service provider -locally based land users-the rural communities?
- Weaknesses
  - no clear demand for ES?
  - no clear options for improving ES?
- Opportunities
  - Would interventions to improve ES would have other benefits for the participants?
  - Is there a local facilitator already working in the area, and with an interest in both conservation and improving rural livelihoods?
  - Is there a locally based representative of the “potential buyers” with a social corporate interest or an interest to improve its image with the local population?
- Threats
  - Are natural hazards a major cause for ES changes?
  - Are there lack of willingness and political support for land managers to play a larger role in ES management?
  - Are there external factors that would affect investments in land management?

The following sites were analysed with more details during the mission:

##### *Critical areas for watershed services:*

- in the west, Woochu sub-catchment (tributary of the river Paro, feeding Thala and Chhukha HP- the most important hydropower plants in the country at the moment);
- Puna Tsang Chhu valley (2 major HP being built, and problems of erosion in the sub-catchment feeding the river), and in particular Tesu geog in Wangdue proposed as a test site for improving and HP Punatsanchu HP I investment in watershed management
- in the East, Bumdeling valley and (iv) the Gamri catchment where erosion is a major problem to explore how to combine biodiversity conservation goals with rural tourism development opportunism with an improved watershed management focus.

##### *Critical areas for drinking water supply services*

- Mongar municipality in Eastern Bhutan is dependant upon limited water sources sheltered in the Yakpugang community forest;
- Thimphu municipality in West Bhutan supplied from small sub-catchment where the city is located and concerned with securing that supply in view of fast growing urban water demand;

##### *Critical areas for biodiversity services*

- The Phobjikha Valley, Wangdue district, with high potential to capture tourism willingness to pay
- the Wangchuck Centennial Park, to pilot test NCD’s forthcoming nature-based development framework in an integrated approach, that would be supported by the ongoing management collaboration WWF-NCD

From this list, three sites with a high PES potential are described in more details through a review of site specific “strengths-weaknesses-opportunities-threats” for PES development. (For details on the other sites and the selection criteria, see Annex 2 Findings of field consultations.

The proposed sites are:

1. For watershed services – site (i) woochu subcatchment in the west of Bhutan
2. For water supply services – site (v) Mongar municipality in the East of Bhutan
3. For biodiversity and landscape services – site (vii) Phobjikha Valley, in central Bhutan.

The potential for bundling environmental services should also be explored. By engaging more than one “beneficiary”, a PES scheme can increase funding availability and cover larger areas (important in the case of watershed benefits due to threshold effects of land-water interactions) and incorporate additional activities that can maximize environmental and social benefits.

#### 4.2. Pilot 1- Improving hydropower investment in Wang watershed management

In the first site indicated as critical for watershed services (site i), **Woochu subcatchment, Wang Watershed** (fig 4.2), the project will aim to bridge some of the scientific gaps related to hydrology and natural resource management to inform future design of PES activities targeted to benefit hydropower generation.

The Woochu subcatchment is located in the most important watershed in the country, from the point of view of hydropower (HP) generation. It is in the Wang Watershed that 90% of the hydroelectricity is being generated, worth about Nu 15 billion<sup>29</sup> and contributing substantially to the national economy and government revenues. The Wang basin framework (2009) proposes that the introduction of PES mechanism to encourage especially the upstream communities in appropriate watershed management. Jamtsho (2006) in her feasibility assessment for PES development in Bhutan, also highlights the need to experiment PES to inform growing interest in the mechanism, and suggests Woochu as one of possible catchments to focus on given the existence of Wang Watershed Management Plan (WWMP) monitoring hydro-meteorological stations<sup>30</sup>. This will also inform government spending in watershed management in general (made on behalf of hydropower and tourism as well) or in requesting additional funds from these sectors.

##### Strengths

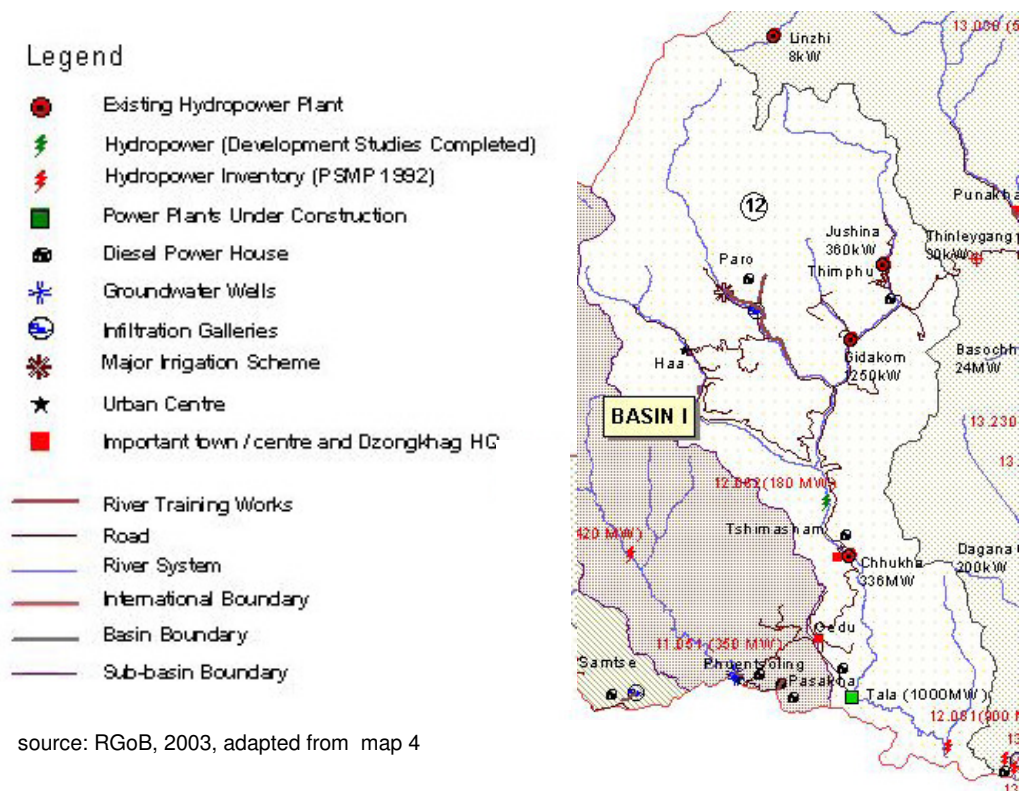
- it is located in the most important watershed for HP in the country, and could inform future watershed management programmes:
  - o in Wang watershed- critical sub-catchment to invest (WMD critical watershed assessment regular programme)
  - o to inform future important HP investments improve the investment of mitigation funds related to the environmental impacts assessment requirements and go beyond compensatory reforestation eg. to improve land management, green and blue water management and reduced erosion.
- its mix of land uses and agro-ecological conditions is representative of much of west and central Bhutan, and can help understand land and water interactions and water related processes in other sub-catchments.
- there are physical monitoring network (hydromet stations) already in place and available data sets on which this project could build with relatively low cost.
- it is representative of the Wang basin in terms of land use but also in terms of environmental related problems- double grazing of alpine area, free range grazing in forest, farmland erosion during fallow period-
- there are progressive farmers, less risk averse that would be able to take up changes;
- there is institutional capacity to manage the scheme locally

<sup>29</sup> Total revenue in 2008, from Chhukha and Thala (both in Chhukha District) amounts to Nu 10,961 billion, while Kurichhu (Mongar) and Basochhu (Wangdue) only contribute with Nu 898 million.

<sup>30</sup> The RNR research centre at Yusipang has been conducting research in this catchment for the past 5 years and has established a good monitoring participatory networking, including hydromet stations and stream gauging stations (3 of the stations are also manually recorded twice a day by members of the community).

- The funding options are readily available- it would be possible to re-direct current hydropower funding from plantation in dry valley to (i) improve green water management in this sub-catchment; (ii) monitoring hydrological impacts of land uses;

Fig 4.2 Map of Wang Watershed, locating Woochu catchment and Chukka and Tala HP



### Weaknesses

- it's not necessarily a food insecure area, and may not target the most vulnerable initially
- land management conditions are not among the most degraded in the country despite some problem areas: double grazing in the upper parts of the subcatchment and high fertilizer use in the orchard area. It is not necessary the most important sub-cathment for HP at the moment, but representative and located in the most important watershed.
- the demand for improved ES is unclear, for example the need to reduce sedimentation does not seem present at that scale.
- the ability to offer improved upper watershed protection is unclear as communities are not involved in state forest management, except if part if transferred to them through a community forest. The critical area is to stay under the state forest for the moment and farmers indicate this as a weakness as there is no control.
- the hydrological importance of small catchment, such as the woochu, for the hydropower is unknown. The Wang river, on which both major HP projects mentioned are installed is fed by these tributaries, that drain the 4,300km<sup>2</sup> basin. The contribution of the tributaries is especially important during the dry season (Dec-Feb) maintaining base-flow when HP production drops below 10% of installed capacity. Woochu is one of such tributaries. While at present the catchment is in good condition for the moment, communities and researchers (RNC- Yucipang) indicate areas with risks of land degradation related to human interventions in and around forest ecosystems (over-grazing, illegal logging, deep soils-forest litter collection...).

### Opportunities

Participatory research in that sub-catchment would help to better understand, and quantify:

- cause-effect relationships between land use practices and soil erosion and sedimentation load in river flows, to inform watershed protection investments in the Wang watershed in the first instance and replicate throughout the country in accordance to the basin management plans being drawn by the WMD.
- there is a research organisation (RNR Yusipang) interested to get involved in that work and in expanding the hydro-physical monitoring schemes already established to assess and monitor additional issues of special interest to the downstream buyers.
- The impacts and responses to them need to be considered at the appropriate scale – efforts to change land use practices to improve an ES and to implement mechanisms for sharing the benefits and costs will be most successful in response to measurable problems in smaller basins (smaller than 100 km<sup>2</sup>), which can then be aggregated at the basin level (FAO, 2003).

### Threats

The Pachu-Wangchu valley is a typical dry valleys<sup>31</sup> inserted in the humid Eastern Himalayan region and under these conditions, plant life is constricted and large trees are unlikely to survive. In fact, major tree die-back (fig 4.3) has been reported in the area ten to fifteen years after earlier plantation efforts back in the 80s (Wangda et al. 2009). This illustrates the need to base investment in watershed management in regular assessment of biophysical conditions and improved understanding of human-induced changes to these processes. It will specifically look into the issues with which HP is concerned with (DGPC MD, personal communication, Oct 09): sustainable forest management and improved grazing management.

Fig 4.3 left to right, top to bottom: Thala reforestation proposal SFD; RNR Yusipang



### 4.3. Pilot 2- Engaging water users drinking water protection, Mongar

As other fast growing cities, the Mongar municipality in Eastern Bhuthan (site iv) raised concerns with the MoA on the sustainability of its water source in quantity and quality and its ability to provide for its future population. The water source is located in a sub-catchment with

<sup>31</sup> Due to warm and dry masses of air being pushed from the south through these valleys with north-south orientation. This orientation also maximizes slope exposure to the sun and increases water loss; soils are thin and grazing continues to exert pressure on natural regeneration. Schweinfurth, 1992; Ohsawa, 1987, Eguchi, 1987; Wangda and Ohsawa, 2006; Wangda et al. 2009

farming activities and forest grazing. The municipality is concerned with the effects of human interventions, in forests and croplands along the sub-catchment, on its water supply.

**The Yakpugang Community Forest** (2.9 km<sup>2</sup>) is located in the large Kuri chu watershed and provides Mongar town (approximately 5000 inhabitants) 100% of its drinking water supply. The municipality is concerned with a flow reduction trend they have been observing over the last 5 years, but the causes of this increased scarcity are not yet understood. On the other hand, the Yakpugang Community forest committee, representing the two local villages (Yakpugang and Kihirar), claims that their stewardship role of the forest (eg. by fencing off the riparian areas) has been protecting the quality of the limited available resources and reducing treatment costs to the town water supply system (only treated for sediment, not chemicals). The PES activities envisaged would aim to link more directly the Mongar municipality, to its local drinking water protection service providers. Potential interventions would target the whole catchment area and aim at avoiding risks from current land-use practices (i.e. overgrazing) and enhancing water infiltration and flood water storage in forest, farming land and paddy area.

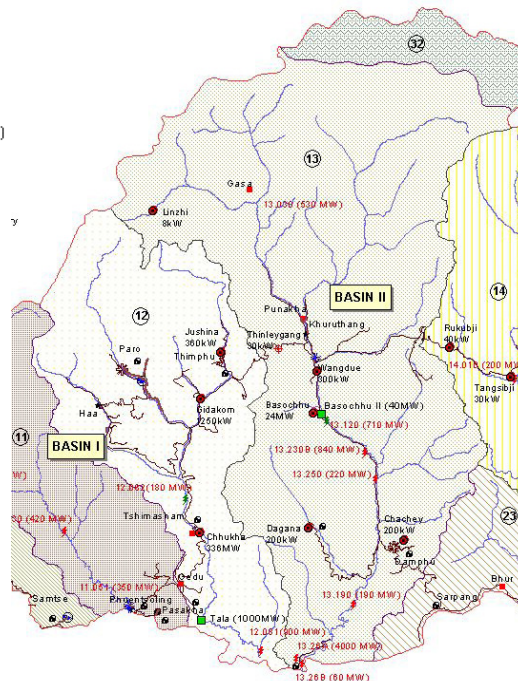
Fig 4.4 Map of Kuri-chu Watershed, locating Yakpugang catchment and Mongar town

Characteristics of the site:

- Altitude: 1800 – 3200 masl
- Aspect: North facing
- Slope:
- Vegetation: Moist, broadleaf, predominantly evergreen
  - Understorey: Daphe, Symplocus, Schima, Daphniphyllum, bamboo species
  - Crown canopy: Quercus, Castanopsis, Acer, Exbucklandia, Nyssia, Mechelia, Juglans species
- Households: 50 from Yakpogang, 56 from Kilikhhar

Legend

- Existing Hydropower Plant
- Hydropower (Development Studies Completed)
- Hydropower Inventory (PSMP 1992)
- Power Plants Under Construction
- Diesel Power House
- Groundwater Wells
- Infiltration Galleries
- Major Irrigation Scheme
- Urban Centre
- Important town / centre and Dzongkhag HQ
- River Training Works
- Road
- River System
- International Boundary
- Basin Boundary
- Sub-basin Boundary



Source: RGoB, 2003

## Strengths

- Mongar town water users are aware of their current dependence in water supply from Yakpugang and know that the management of the CF and surrounding lands may affect

- the size and quality of supply; water user representatives are willing and able to increase water use fees to include a water protection fee.
- Alternative options for future provision are costly as they would imply long distance transport and pumping to bring the water to the level of the Mongar city perched on a ridge at 1800 meters.
  - Highly replicable: safe drinking water supply is a concern for all growing urban settlements in Bhutan. Most of the cities tap streams or sources in forested areas in nearby sub-catchment as done for Mongar city. Most of the forests that protect these water resources are state forests that are increasingly being delegated as community forests to local communities who take on the role of protecting and managing them and do invest time and money to doing so. The water needs of downstream users may imply changes in land use practices or create constraints on the way these communities use and manage their forests or farming lands. The case of Mongar may help to direct improved linkages between downstream water users and upstream land managers and identify the best financial mechanism to improve the necessary water stewardship in critical subcatchments for drinking water supply.
  - Clear link provider-user: the beneficiary of the service – the town- is located in a short distance of the service providers –8 km from the two villages- and will easily interact and assess progress, as their water storage tank is located there.
  - There are existing institutions that could take on this responsibility- Community Forest committee. The Committee is managed by a local committee representing the two villages located within the sub-catchment Yagpogang and Kilihar. The CF management plan defines rights, and obligations about forest resources uses (each member contributes a minimum of 5 working days annually; the committee members 15 to 20 days minimum- to their general activities, including water sources protection) and specifies mechanism for payment (fees), compensations (working days) and control (monitoring, fining etc). Use of all CF based ES (timber, NWFP, leaf litter, grazing areas...) is regulated by the communities.
  - Communities are aware of ES provision from their lands. Yakpugang and Kilihar communities are willing to improve CF management beyond that required by law, in return for compensation for their role water protection - eg. fencing of priority areas for water protection and are open to options: compensation for loss grazing grounds? replacing with fodder banks elsewhere? Cash payments to community funds tied to verified efforts they do to protect Mongar water sources. The discussions during the field consultations suggest various options that could be explored- these are reported in annex 2.

### **Weaknesses**

- Unclear if PES could address the water scarcity problem: the real problem may lie in the unbalance between growing water demand and reliance on a single source, whose supply capacity is inadequate. The town and neighbouring communities already suffer from insufficient supply in winter months where 100% of the flow of the stream tapped 8 km away into the CF is used .
- Difficulty in justifying additional investment for water source protection as:
  - o difficult to justify water protection or risk of damage if no additional water protection payment is made. The Community forest (CF) use rules already ensure sustainable forest use. Protection of these water sources in the forest, was one of the main reasons for the local communities to push for a 290 hectares community forest, set in 2001 and now in its second plan framed for 10 years.
  - o Water management as such is not included in the CF management plan, there are no water protection fees being paid. However, most of the critical areas for water drainage in the upper part of the catchment are in fact being restricted for grazing, and most of the sources are fenced. A large part of the forest area has also fenced on both sides of a central trail that link Mongar with a nearby Geog- this limits uncontrolled grazing and its eventual impact in erosion.
- Lack of evidence to support negotiation: The CF plan (2006) indicates that after establishing the community forest, the forest conditions improved dramatically

comparing with the previous forest conditions. However, there is no evidence that improvements in forest conditions have improved, or avoided worsening water supply.

- Some local authorities consider that land users do not require compensation for their role in improved watershed management.

### **Opportunities**

- The providers are proactive farmers, with a 5 years management experience of community forest, willing to try new things important in this testing phase of a financing mechanism.
- Considering the low availability of farming land available (out of the 50 households of Yakpugang village, 10 households own only 1 acre of farming land), investment in improved management, with a view to reducing possible negative impacts on water, could generate additional benefits to the communities.
- Communities are also interested in diversification and increasing their income from community forest resources- opportunities to introduce new production methods, products or support with market development could be well received as incentives for improved NRM.

### **Threats**

- Lack of historical data on the hydrological behaviour of the stream may prevent the drawing of conclusions regarding cause and effect of NRM.
- Climate Change induced alterations may undermine any positive benefits of interventions funded by PES project

## **4.4. Pilot 3- Tourism investment in sustainable development of Phobjikha valley, Wangdue**

Ensuring a balanced development of income-generating tourism activities with habitat protection and maintenance of landscape values requires a comprehensive approach to conservation and development. A PES scheme could help align efforts from different organizations working in the area and legitimize the collection of a local “conservation and development fee” for earmarked local investment in the maintenance of the valley’s tourism and biodiversity values.

The Phobjikha Valley, Wangdue district (site vii), is one of the main tourism hotspots in Bhutan for scenic beauty and biodiversity (162km<sup>2</sup>; 4700inhabitants). The large wetland in the upper valley is a winter nesting ground of the endangered black necked cranes and attracts thousands of tourists every year. The valley is an excellent example of biodiversity and landscape values remaining undervalued by the local population, and imposing on them development restrictions for which they get no support or compensation. Their main source of income is farming and in particular in the recent years intensive potato cultivation, which may threaten the quality of the wetland with chemical pollution.

This site, shows high potential to demonstrate the application of this mechanism by capturing tourism willingness to pay for biodiversity conservation and landscape management and invest in rural development activities that are consistent with these goals and indirectly compensating farmers for land use restrictions. These activities can include training and/or grants to improve farm management (eg. towards organic production to reduce fertilizer inflow into the wetland), and additional investments in scenic beauty (by providing grants for urban improvements keeping the village’s traditional features). Support for tourism development activities, like encouraging local supply of goods (to hotels) and services (local guides, farmhouse meals and stay) can also act as a compensation for development restrictions within the conservation area and diversify income to reduce farming pressure (eg. from intensive potato production along the valley’s slopes).

### **Strengths**

- While recognition of its legal status is pending, funding to implement the conservation priorities within the plan is not yet available. In other protected areas in the country,



availability of funds is limited and NCD is exploring options to capture more tourism revenues for park management. PES could act as an innovative mechanism to increase funds available.

- There is willingness to pay for landscape protection in the valley:
  - o Phobjikha offers good conditions to test this pilot approach due to the fact that it is a tourism hotspot with important conservation values to preserve and still relatively under-developed tourism potential- it is likely that there would be willingness to pay for the maintenance of the current values and for investment in its protection, especially if it benefits the local community<sup>32</sup>.
  - o Considering the number of tourists, even low WTP would generate significant funds for the area. As an indication, in the management plan prepared by RSPN, budget requirements for its nature conservation activities, for the first 5 years (thus includes much of establishment costs) are estimated at Nu1.5million/year or 32,000USD (of a total Nu10million or 215,000USD). Considering that the valley gets about 6000 visitors a year, for at least one night, this would require a contribution of only 5USD per tourist (233Nu).
  - o Informal discussions with tour operators working in the area reveal that from their experience tourists would be willing to pay such an amount, provided that its goals and investment priorities would be made clear. For the tour operators, the interest in facilitating this process lies in ensuring the maintenance of the landscape values in the area.
- Development is partly restricted by the fact that the valley has been designated as a conservation area<sup>33</sup> and its existing management plan introduces considerable limitations in terms of farm land use and building restrictions.
- Existing institutions: RSPN has longstanding experience working in the area and district technical officers could be trained support adoption of PES-supported measures;
- Funds could be channelled to the valley's existing environmental management committee and disbursed for specific activities. The Committee already has the mandate to promote: "4.2 transparent accountable and harmonious socioeconomic progress in the communities with minimal adverse impact on the natural environment and critical habitats of the endangered species of birds and animals; and 4.3 an integrated development approach between environmental conservation and socioeconomic development in the communities" (Gangtey and Phobji geogs)
- The hotels and tour operators consulted have demonstrated willingness to support such a scheme that clearly benefits the base of their activity. Informal discussions with one hotel manager and the tour operator who owns it verifies the feasibility of this option- the hotel would be willing to pay what they currently pay for procurement of vegetables in the nearest town plus current costs with fuel and staff time, provided that local supply is reliable and varied.

### Weaknesses

- Results from investments made through the collection of this fee would be highly dependant on the enforcement of conservation policies, and investment in adequate habitat and tourism management by the relevant authorities- eg. wetland habitat may be being disturbed by visitors, vehicles and grazing in core zones. Facilities such as raised walks and photographic hides are required to reduce impact.

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<sup>32</sup> "Despite this phenomenal rise in the number of visitors, there is very little benefit to the local people from tourism. Therefore, a proper strategy that monitors and channels *benefits to the local people is necessary to solicit the cooperation of the people in conserving the natural assets of the valley. (...) local people benefit very little from the tourism industry as they lack the capacity to provide either services or products to cater to the need of visitors. The existing tourism facilities are owned by people from outside the valley who dominate the service industry and business.*" RSPN, 2009

<sup>33</sup> The designation of this area as a Conservation Area has been mentioned in the Biodiversity Action Plan of Bhutan since 2002, as well as its management plan.

- Farmers are not organised to provide regular fresh products and there is a trend towards more potato development targeting outside markets. There is not yet a policy of higher price for organic products that may favour the development of organic farming, able to compete with less labour intensive potato farming.

### **Opportunities**

- Easily replicable in other protected areas or natural tourism hotspots throughout the country, especially in light of the current discussion around developing an Ecotourism Framework for Bhutan, led by NCD.
- Support from the national organic production programme of MoA as elsewhere in Bhutan, and an opportunity to explore how the “low cost” agriculture techniques offered can improve food security in the valley and be self-sustainable in the long run. Low-input farming is a viable option (and is practiced by most farming communities) as dictated by production and marketing conditions.
- Currently tourism services provided in the valley are limited but it is clear that tourism development opportunities will grow in the area, especially since the connection of the villages to the electricity network will be complete in 2010. Tour operators are enthusiastic about Phobjikha valley but the lack of suitable accommodation is a problem.<sup>34</sup> With basic service upgrades, local farmhouses, have the potential to increase the local supply of services and an important source of revenue to the local families- farm guesthouses could offer good quality accommodation services at lower rates than the hotels, which could reduce overall costs to tour operators. TCB has developed a vision for farmhouse accommodation with which this suggested initiative would need to align itself.

### **Threats**

- Given the centralized management of tourism activities and charges, there has been little local capture of tourism revenues at the local level. Protected areas do not charge entry fees and local supply of goods and services to the tourism industry has not been stimulated by this centralized demand or supported by significant training investments.
- If policies do not evolve to allow for decentralized charging and investment decisions, PES will not have a legal basis to operate.

For more details on the findings of feasibility for each of these sites, see annex 2, particularly the section on project identification findings for PES design.

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<sup>34</sup> From 2005 to 2008, tourism volume in the area increased from 529 bed-nights to 6,173 (from a total of 220,116 countrywide), due to the opening of one hotel in 2007 (Amankora Gangtey hotel, 8 rooms) and another in 2008 (Dewachen hotel, 16 rooms), raising tourist stays to over 6,000 (RSPN, 2009). There are also three guesthouses, in traditional farmhouses, offering 8 rooms each but tourists normally prefer staying in the hotels due to the better facilities offered.

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## Annexes

### 1. Diary of the mission and list of consultations

Date		Activity	People met		Discussions
01/10/2009	Th	travel to Bangkok			
02/10/2009	Fr	UNESCAP	Mr. Le-Huu Ti	Chief, Water Security Section, Environment and Development Division Un-ESCAP	Discuss the use of PES as incentives for action under the UN-ESCAP project "Development of Eco-efficient Water Infrastructure"
		FAP-RAP	Mr. Thierry Facon	Senior Water Management Officer, Natural Resources Management and Environment Group (RAPS), FAO RAP	Discuss link with regional projects and implication of FAO RAP experts – link with planned water projects in the region
			Mr Zhijun Chen	Technical Officer, Natural Resources Management and Environment Group (RAPS), FAO RAP	Discuss link with ongoing water activities in Bhutan (irrigation project in the south)
			Mr Yuji Niino	Land Management Officer, Natural Resources Management and Environment Group (RAPS), FAO RAP	Discuss link with ongoing SLM activities regionally and in Bhutan
			Mr Simmathiri Appanah	National Forest Programme Advisor, Forestry Department, FAO RAP	link with ongoing forest activities in Bhutan (revision of the forest act and how to phrase PES enabling components in it)
04/10/2009	Sun	Arrival to Thimphu	Mr Chadho Tenzin	Bhutan-FMPP coordinator	
05/10/2009	Mo	Discuss with WMD team including Agriculture Research Centre RC-Yusipang (Paro)	Karma Tsering	Chief, Watershed Management Division, MoA	First contact with Bhutan proposed PES team, and discussion on mission objectives and expected outcomes Planning of issues to discuss and materials to collect over the following week of consultations. During the course of the work, two other forestry officers of WMD joined the team: Mr Jigme Tenzin and Ms Sonam Wangchuck
			Shacha Dorji	Chief Forestry Officer, Watershed Management Division, MoA	
			Mr Tashi Samdrup	Chief Forestry Officer	
			Dr Pema Wangda	Forestry Officer, RNR Research Center, Yusipang, Ministry of Agriculture	
			Dr. Lungten Norbu	Program Director, RNR Research Center, Yusipang, Ministry of Agriculture	
		Ms Tashi Yangzom	Policy planning division		
Audience with Minister of Agriculture	Dr. Pema Gyamtsho	Honourable Minister of Agriculture	Presentation of mission objective and getting strategic inputs from minister		
06/10/2009	Tue	Gross National Happiness Commission (Planning) GNHC	Ms Karma	Chief Planning officer, Local development division, GNHC	Informing the Planning Commission (GNHC) of the goal of the mission and explore their interest in PES as a tool for local development
			Mr Norbu Gueltshe	Planning officer	
		Ministry of Economic Affairs (MoEA)	Mr. Sonam Tshering	Secretary, Ministry of Economic Affairs	Discuss possible set-up of a national PES mechanism focusing on Hydropower and Tourism economic activities: their interests and possible means of charging and investing ES fees
			Mr. Yeshe Wangdi	Head, Dept of Energy	
			Mr Yeshe Dorji	Head, Dept of Hydrology and Mines	
			Mr Sangay Dorji	Senior Environment Officer, Environment unit, Ministry of Economic Affairs MoEA	
			Mr. Sonam Lhendup		
Bhutan Power Company (BPC)	Mr Bharat Tamang Yonzen	Managing Director, Bhutan Power Corporation Ltd.	Discussing a) feasibility of adding PES fee to electricity fees being charged, b) understanding environmental impacts of their activity (Electricity Transmission and Distribution)		

		Tourism Council of Bhutan	Mr Thuji Dorji Nadik	Head of Plans and Programmes, Tourism Council of Bhutan	Discussion their interest in PES-led investment in along tourism corridors and hotspots; Feasibility of adding ES management fee to tourism fees, at central or local level;
		Briefing to MoA	Dasho Sherub Gyaltshen	Secretary, MoA	Presentation of missions calendar and goals; getting inputs from different MOA divisions on related activities and interest, suggestions for avenues to explore and people to meet
			Mr Karma Dukpa	Director DoF	
			Dr Tashi Samdrup	Director, Council for RNR Research of Bhutan (CoRRB)	
			Mr Karma Dorji	Executive Director, BAFRA	
			Mr Kencho Wangdi	Joint Director, Dept. of Livestock	
			Dr Tashi Yangzom	Programme Director, National Biodiversity Centre	
			Ms Karma Derma Dorji	Chief Soil Fertility and Plant Nutrition officer, National Soil Services Centre, DoA, MoA	
			Mr Kinley Tshering	CFO Forest Resources Development Division (FRDD)	
			Mr Chadho Tenzin	Assit FAO Rep, FAO Bhutan	
			Dr. Lungten Norbu	Program Director, RNR Research Center, Yusipang, Ministry of Agriculture	
			Dr Pema Wangda	Forestry Officer, RNR Research Center, Yusipang, Ministry of Agriculture	
			Ms Yuden Dorji	Principal Horticulture Officer, Horticulture Division, DoA	
			Mr Tenzin Drugyal	Agriculture Officer, Dept. of Agriculture (DoA)	
			Mr Choni Dhendrup	Marketing Counsellor, Agriculture Marketing Service	
		Mr Sonam Norbu	Marketing Counsellor, Agriculture Marketing Service		
		Interview with Kuensel (national newspaper)	Mr Tenzing Lamsang	Chief Reporter	Presentation of the mission and its goals. Story reported in: <a href="http://www.kuenselonline.com/modules.php?name=News&amp;file=article&amp;sid=13677">http://www.kuenselonline.com/modules.php?name=News&amp;file=article&amp;sid=13677</a>
07/10/2009	Wed	SNV Netherlands Development Organisation	Ms Megan Ritchie,	Country Director, Bhutan & Bangladesh, SNV Bhutan	Presentation of PES FAO mission and discussion of SNV own PES programme: scoping for opportunities for collaboration on their planned development of guidelines in SLM for watershed management and support to WMD in piloting of PES as a benefit-sharing mechanism to address gender and pro-poor issues, between DGPC and Community Forest Groups
			Mr Thinlay Wangchuk	Watershed Management Specialist, SNV East, Kanglung	
			Mr Kencho Wangdi	Portfolio coordinator, SNV	
			Mr Maung Moe Myint	Research Scientist, Yale School of Forestry and Environmental Studies with SNV	
		DANIDA Liaison Office of Denmark	Ms Tek B Chhetri	Deputy Head, Senior Programme Officer, Liaison Office of Denmark	Presentation of PES FAO mission and discussing Danida's interest in using PES for benefit-sharing purposes, especially in relation to water conflict resolution; Interest in supporting capacity-building investments in this arena and exploring the possibility of adding water protection fee to existing, very low, water use fees.

		RSPN Royal Society of the Protection of Nature	Ms. Rinchen Wangmo	Conservation and development coordinator, RSPN	Presentation of PES FAO mission and discuss collaboration on the development of PES as compensation for development restrictions in Phobjikha Conservation Area- discussion of PES-related RSPN activities ongoing or planned for the area and scope for cooperation
			Ms Manju Giri	RSPN	
			Mr. Trinh Thang Long	RSPN	
		SLMP-NSSC  Sustainable Land Management Project (GEF-WB-DANIDA) hosted by the National Soil Services Centre (MoA)	Ms Karma Derma Dorji	Chief Soil Fertility and Plant Nutrition officer, National Soil Services Centre, DoA, MoA	Presentation of PES FAO mission and discuss collaboration on the development of PES as incentives for SLM adoption and location of field consultations and pilot sites to be proposed <a href="http://www.moa.gov.bt/nssc/projects/slmp.php">http://www.moa.gov.bt/nssc/projects/slmp.php</a>
		Druk Green Power Company (Hydropower generation) DGPC	Mr Chhewang Rinzin	Managing Director, Druk Green Power Corporation Limited	Presentation of PES FAO mission and discuss DGPC's interest in improving watershed management, geographic priorities and RNR management concerns. Examine willingness for additional contributions to MoA and investment priorities.
08/10/2009	Th	Thimphu City Corporation (water and water management)	Mr Phuntsho Gyeltshen	Executive Secretary, Thimphu City Corporation	Presentation of PES FAO mission and relevance of PES (for water supply protection) for their activities in terms of water and water management- scoping opportunities for combining stronger command-and-control measures (ie. higher use fees) with incentives for improved behaviour (eg. waste separation and recycling)
			Mr Pema Dorji	Senior Environmental Officer, Environment Division, Thimphu City Corporation	
		MoA	Dasho Sherub Gyaltshen	Secretary, MoA	Following MoA Debriefing on 06/10 further discussion to incorporate Secretary's strategic inputs in mission structure and tactic
09/10/2009	Fr	NRDCL Natural Resources Development Corporation Limited (timber operations)	Mr Gyem Tshering	Deputy Managing Director, NRDCL	Presentation of PES FAO mission and discussion of applicability of PES instrument to forest resource management; explore means of in kind compensation for ES provision in the form of additional timber allocation or improved access to wood products for prospective participating farmers
		Prepare for the workshop with WMD team			
10/10/2009	Sat	Prepare for the workshop- materials			
11/10/2009	Sun	Prepare for the workshop- venue			
12/10/2009	Mo	Day 1- National PES Feasibility Workshop			
13/10/2009	Tue	Day 2- National PES Feasibility Workshop	See Workshop Report and list of participants in Annex to Feasibility Report Interview with national radio (BBS)		
14/10/2009	Wed	Workshop follow-up and preparation of field visit with WMD team			
15/10/2009	Th	Travel to Punakha; meet Punakha Dasho Dzongda & staff; Travel to Chorten Nobu village and meet with	Mr Kunzang M. Tshering	Governor of Punakha district	Presentation of PES FAO mission and discussion with District Governor and officers regarding PES applications in his constituency, main NRM problems and opportunities for capturing ES willingness to pay (eg. tourism development, hydropower investment in watershed management, drinking water supply)



		community; travel to Wangdue	Mr. Kaka Tshering	Punakha Offtg. DzFO	
				Village leaders of Chorsten Nyebu village	Ground proofing of discussions with governor and officers in one village- main problems are related to inadequate water supply infrastructure; potential for village-based tourism development but with considerable capacity building costs and low annual demand
16/10/2009	Fr	Travel to Tesu geog and meet with Manju village community; meeting with Wangdue Dasho Dzongda & staff;		Village leaders of Tesu geog, Wangdue	Local level discussions of NRM problems and opportunities for capturing ES willingness to pay- conflicts over water use rights (based on customary rules) strongly limit agriculture production and hamper safe drinking water supply; important erosion problems in farm land that could possibly affect hydropower project (Puna Tsang Chhu I) under construction if other subcatchments presents the same level of degradation; no potential for village-based tourism development;
			Mr Kinzang Wangdi	Governor of Wangdue district	Presentation of PES FAO mission and discussion of issues raised in the village with district governor to confirm if they represent the conditions in his district.
		Agriculture Research Centre at Bajo, Wangdue	Mr Mahesh Ghimiray	Principal Research Officer	Presentation of PES FAO mission and sharing of information about ongoing SLM work in the area neighbouring Tesu geog that could be upscaled via PES
			Mr Thinlay Gyamtsho	Dy. Chief Research Officer (SLM)	
17/10/2009	Sat	Visit of Punasanchu I hydropower construction sites and meet with project engineer, and in particular the environment engineer; Travel to Phobjikha	Eng. Arun Kapoor	Executive Engineer (Powerhouse)	Visit to large hydropower project (Puna Tsang Chhu I) under construction to discuss concerns over silt load and watershed management concerns over impacts to production- projects are equipped with desiltation chambers that minimize the problem
			Eng. Narneet Sool	Asstt. Executive Engineer (Powerhouse)	
			Mr Lobzang Dorji	Sr Environmental Officer	
18/10/2009	Sun	Meetings with Phobjikha valley local stakeholders	Ms. Tshering Chuki	Phobjikha RSPN visitor, Field Coordinator	Ground proofing of discussions with RSPN central office
			Ms Dawa Zam Ms Pema Choden Ms Phub Lham	Gangtey village, Reps of women's association (Gangtey) Geog tshogpa and women's association member from Phobjikha villages	Local level discussions of NRM problems and opportunities for PES as compensation for development restrictions in Phobjikha Conservation Area and willingness to participant in relevant activities; consideration of feasibility
			Mr Chencho	DoF extension agent phobjikha	
			Ms Karma	Phuntshocholing Farm Guesthouse owner	
19/10/2009	Mo	Meeting with hotel manager ; Travel back and meeting with organic farming expert in RNR Yusipang	Mr Lotey	Manager, Dewachen Hotel	Scoping willingness to cooperate in the development and operationalization of new ES fee to be charged to tourists, locally, via accommodation bills- seems feasible and investment in resource base desirable; willing to cooperate in the development of a local supply chain of organic agriculture produce
			Ms Kinlay Tshering	Organic farming expert	Discussion on technical packages available for organic potato and horticulture production, and associated costs and training requirements- work is ongoing in other parts of Bhutan and Phobjikha could benefit from exchanges with those communities; the centre is
			Dr Pema Wangda,	Forestry Officer, RNR Research Center, Yusipang, Ministry of Agriculture	
			Dr. Lungten Norbu	Program Director, RNR Research Center,	

20/10/2009	Tue	Meet FAO consultant working on the draft Forest Law	James Wingard	Yusipang, Ministry of Agriculture International Legal Consultant, FAO RAP	also able to provide specialized training there Discussion over how to incorporate PES enabling provisions in the new Bhutan Forestry Law
Prepare for Woochu field consultation					
21/10/2009	Wed	Field visit to Woochu catchment, Wang Watershed	Mr Dorji, Gyeltsen Mr Akey Dorji Mr T.P. ? Mr Tshewang Penjor Ms. Dawa Pem Ms. Namgay Wangmo	village leader of Woochu Forest territorial Officer, Paro Forest extension officer Woochu Tshogpe? Jewpher? Woochu	Local level discussions of NRM problems and opportunities for capturing ES willingness to pay- land use mix in subcatchment representative of the wider watershed; existing hydrological monitoring stations- good potential to introduce SLM improvements to monitor impact and inform existing Hydropower investment in watershed management downstream
22/10/2009	Th	Consolidate information from field consultations. Prepare for Tourism-focused second round of consultations			
23/10/2009	Fr	Joint meeting with Nature Conservation Department (NCD ), DoF, MoA and RSPN	Mr Sangay Wangchuk? Ms Nanda Ritsma Ms Marianne Meijboom Ms Rebecca Pradhan	Director, NCD SNV Tourism Specialist NWFP specialist Vegetation Ecology and Wildlife Conservation RSPN	Discussion on how to establish partnerships for tourism-driven PES in designated areas. NCD is working on an ecotourism framework that proposes options for collecting fees to protected areas and supporting nature-base tourism development- first draft expected at the end of the year, led by Ugyen Wangchuck Environmental & Forestry Institute in Bumthang
		SLMP-NSSC	Mr. Hans van Noord Mr. Tsering Dorji Mr. Tashi Wangdi	Land management specialist, SLMP Soil survey unit Head PM-SLMP	Discuss partnership to mainstream SLM in each pilot site being proposed- align methods and sharing SLM assessment tools
		Social Forestry Division, DoF, MoA	Mr B. B. Chhetri Mr Karma Jigme Temphe Dr Kaspar Schmidt	Joint Director, Social Forestry Division, DoF, MoA Social Forestry Division, DoF, MoA Advisor, Participatory Forest Management Project, Helvetas- Swiss Association for International Cooperation	Discuss possibility of using Community Forest Committees as local focal points for PES development; Focus on the profile of community forests as guardians of water sources and interest in using PES to clarify and valorise this role to water users- identification of an additional pilot site to explore: Yakpugang Community Forest where Mongar town has its drinking water supply intake and desiltation plant.
		MoA Marketing	Mr Dorji Rinchen	Deputy chief Marketing officer, Agriculture Marketing services, MoA	Examine opportunities for marketing development for organically produced products in Phobjikha in particular. Transferable experiences from Bumthang.
		Bhumtang MoA marketing officer on Bumtang organic farming experience	Mr. Gaylong	Organic production, Officer DAO, Bumthang	
24/10/2009	Sat	Follow up on Tourism meetings of the previous day; literature review of materials collected			
25/10/2009	Sun	prepare for Tourism-focused second round of consultations			
26/10/2009	Mo	Meetings with Tour Operators: Bhutan Heritage and Yangfel	Mr Hishey Tshering Mr Karma Lotey	Manager, Bhutan Birding and Heritage Travels Managing Director, Yangphel Tours	Discuss partnership to develop a new conservation and development fee for tourism activities in the Phobjikha valley, and whether this could be transferable to other tourism hotspots and corridors in Bhutan- Tour operators willing to pilot the experience and RSPN willing to mainstream pilot activities into their upcoming biannual strategic planning meeting at the beginning of 2010
27/10/2009	Tue	Meeting with RSPN Director	Dr Lam Dorji	Executive Director, Royal Society for Protection of Nature- RSPN	

		Draft feasibility Report			
28/10/2009	Wed	Draft Feasibility Report			
29/10/2009	Th	Draft Feasibility Report			
30/10/2009	Fr	Draft Feasibility Report			
31/10/2009	Sat	Woochu Pilot development	Dr Pema Wangda	Forestry Officer, RNR Research Center, Yusipang, Ministry of Agriculture	Development of pilot site proposal for Woochu subcatchment. Brainstorming on how to integrate REDD in the proposal
		Marketing opportunities	Mr. Chado Tsering	SARC-forest	
			Ms Marie Derville	FAO marketing consultant	Explore connections between PES and marketing development of yak-based herder economies in the alpine areas of Bhutan
01/11/2009	Sun	Travel to Bumthang (stop over for the night)			
02/11/2009	Mo	Travel to Mongar			
03/11/2009	Tue	Meet Mongar DASHO DZONGDA & staff; Meet territorial Forest officer; Meet with Mongar municipality	Mr. Sherab Tenzin	Dzongag, Dzongkhag Administration Mongar	Discuss urban water supply problems and perceived responsibilities. Yakpugang community has made two requests for PES rendered to the district government in the past.
			Mr. Sithar Dorji	CFO Mongar	
		Travel to Yakpugang village and meet with community forest group	Mr Tshering Namgyel Mr Tashi Norbu Sherpa and other five members		Transect walk to understand possible land-water interactions in the subcatchment and estimate Community Forest investment in water source protection (fencing of priority areas, organic production).
04/11/2009	Wed	Transect walk in Yakpugang sub-catchment (water streams, community forest)	Mr Naiten Wangchuck	Yakpong CIMG, Mongar	
05/11/2009	Th	Travel to Bumthang			
06/11/2009	Fr	Travel to Thimphu ; Circulate early draft of report for feedback prior to workshop			
07/11/2009	Sat	Complete report- incorporate info from Mongar field visit			
08/11/2009	Sun	Draft Project Proposal			
09/11/2009	Mo	Draft Project Proposal			
10/11/2009	Tue	Draft Project Proposal			
11/11/2009	Wed	Prepare for the workshop			
12/11/2009	Th	Final workshop	See Workshop Report and list of participants in Annex to Feasibility Report		
13/11/2009	Fr	Incorporate workshop suggestions into draft report and proposal			
20/11/2009	Fr	Circulate final draft for comment. National radio interview (BBS)			
23/11/2009	Mo	Departure to Bangkok			
24/11/2009	Tu	Departure to Rome			

## 2. Findings of Field Consultations

The PES rapid feasibility assessment presented in the main report suggested a national PES scheme but recommended an initial trial phase where PES scheme design should be tested prior to developing a national scheme. This Annex summarizes some of the ideas and options that were proposed during the consultations and whose feasibility was discussed in the field consultations and could be further explored in the next phases of detailed design

Focusing on few pilot sites, would enable to clarify the criteria for investments selection –which intervention, where, for whom. The Thimphu consultation phase identified seven potential sites in the country bundling various environmental services (table 1). All the sites were important for some of the key beneficiaries of natural resources identified (table 2). Hydropower, municipal drinking water supply, and tourism are those potentially able to pay for such services. Field consultations in five of the seven sites enabled to get local communities perspectives as they would be the service providers and verify main assumptions. The field consultations informed the site selection for a trial phase as summarized in table 3.



### — Assessing available environmental services in the different sites

For each site, the existence of environmental services, and the threats to these services were discussed. Table 1 shows that most sites offer multiple environmental services and that bundling of services would be possible.

Table.1: Potential ES benefits in the proposed sites

	Tentative sites	Watershed			Biodiversity and landscape		Carbon
	Potential priority areas for PES	vulnerability (risk of soil degradation)	watershed health regular water supply for HP	secure water supply for drinking water	biodiversity for tourism	landscape for tourism	carbon pools for int. buyers
(i)	Woochu catchment		VVV (tributary of Pa-chu feeding in Chhukha, tala HP)	VVV (multiple water users in and out of catchment)	V (alpine flowers, local tourism)	V (varied landscape, up to pass at 4200m)	V
(ii), 2 sites	Puna Tsang Chhu (valley + sub-catchments)	VV (dry valley and erosion in sub-catchments)	VV (2 major HP projects in construction- Puna Tsang Chhu I and II planned)	V (water used from tributaries not main river)	VV (white bellied heron)	V (scenic paddy fields)	V
(iii)	Gamri catchment	VVV	V	V	VV (Sakten sanctuary)	VV (cultural with herders communities)	V
(iv)	Bumdeling catchment	VVV			VV (Bumdeling wildlife Sanctuary)	V	V

(v)	Yakpugang sub-catchment	V	V (feed in Kuri-chu river)	VVV	V	V	V
(vi)	Thimpu sub-catchment	VV	V	VVV	V	V	V
(vii)	Phobjikha valley			V	VVV (migratory bird, wetland)	VVV (large scenic valley)	VV
Viii	Wangchuck Centennial Park	'-	'-	'-	VVV	VVV	VV

Note : V – exist ; VV – important ; VVV- very important; '- not explored

### — Evaluating demand for environmental services and ability to pay

ES beneficiaries can be groups in four main types: forest users, farming land users, water users, users of landscape and biodiversity. These may be located on the intervention area itself (on-farm benefits), near it (downstream village), in other areas of the country (water in large watersheds) or the world (carbon and biodiversity). Farmers in fact use all the services but have restriction on some of these such as logging, grazing, and water availability for irrigation, or drinking. Other users have better “ability to pay” to access the service for specific benefits (energy production, drinking water supply, nature-based tourism).

Table 2 below summarizes for each “buyers”, their areas of priority investments and the benefits they get. The presence of these different buyers was checked and the “ability to pay” for ES also assessed in the proposed sites

Buyers	Importance of use	Product	Critical areas	Checking the ability to pay of existing buyers in the potential pilot sites (nb) number of the site where buyers able to pay area identified.
<b>Forest users</b>	72 % of total area	timber NTFP grazing carbon credits	FMUs SFM grazing permits	-All sites have direct forest users – farmers – who have constrained access and pay fees for grazing. Many of the sites have FMUs units managed centrally by a government company that already pay a royalty on timber use and a social corporate tax. -All sites are indirect users of the hydrological function of forest cover, regulating flows but nobody is paying for the water service.
<b>Farming land users</b>	8% of total area	crops fodder	farmlands	-Farmers are the major users of the cropland in all sites. -All sites are indirect users of the hydrological function of farmland management, where land and water conservation practices preserve quality and favour water infiltration and availability for downstream uses.
<b>Water users</b>	(relative importance to be assessed in each site)	domestic industry energy agriculture ecosystem function	MoHs map of settlements MoEA map DGPC map irrigated area	-Now: (v) Mongar city dependant on the water produced in Yakpugang sub-cathment. (2 upscale to wang watershed) Thimpu and Paro city dependant on sub-cathments. -Now: (i) Chukka and Tala HP (and the electricity users in Bhutan and beyond) dependant on the water runoff from all the sub-catchment feeding in the wang watershed. -Future: (ii) in the future Punasanchu I and II HP will be dependant on the water produced in the Puna sanchu watershed.
<b>Biodiversity/ rural landscape users</b>	% (PA + Bio corridors, conservation areas)  Tourism corridors (including access	aesthetic and culture benefits  (value= entrance fees, travel cost; accommodation costs etc)	% PA + Bio corridors  Tourism triangles and future and trekking routes	-All sites benefit from well preserved forest and rich biodiversity but they have limited buyers (mostly the government, and conservation NGOs, Tour operators), and even less even to pay. -Now: (vii) Phobjikha valley, a major local and international tourism hotspot for its scenic beauty, but also an area important for biodiversity. - Future:(i) , (iii) and (iv) are expected to attract a larger number of tourists in the future for their

	roads) and trekking routes	carbon credits		scenic beauty and the rich biodiversity. However, for the moment tourism is limited in these sites.
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There are different collection mechanisms that can be tested in the proposed sites. In a preliminary stage, the mechanisms suggested include:

- redirecting (polluter-pay) compensatory afforestation funds from hydropower projects to wider watershed management interventions (Woochu subcatchment, Wang Watershed) to inform the creation of the planned watershed management fee to water used for energy production in the future
- securing (user-pay) watershed management support from water users earmarked for investment in critical watersheds for the purpose of maintaining current water quality and improving water flow through demand management and adoption of green water management techniques (Yakpugang community forest- Mongar)
- demonstrate (user-pay) local willingness to pay for biodiversity conservation and/or landscape management by adding a fee to accommodation costs in tourism hotpots, to be charged locally by hotels and guesthouses and channelled directly to the local community for investment in specific activities of interest for NR management, local development and tourism interests (Phobjikha valley)

#### — Screening for the most promising sites

The Table 3 summarizes the reasons for selecting the 3 sites and the ranking after the feasibility workshop (A) and revised after the field visits (B). The field visits enabled to meet with representatives of the local communities, local authorities (at district and sub-district levels), as well as sectors extensionists (forest, environment, agriculture officers), as well as researchers working in the area. In this way, the sites that revealed highest potential to hold a pilot PES scheme were: (i) Woochu sub-catchment in Paro district (Western Bhutan), (v) Yakpugang sub-catchment in Mongar district (Eastern Bhutan) and (vii) Phobjikha valley, Wangdue district (Central Bhutan).

In addition, other sites seem to have good potential for PES development, provided that the stakeholders already engaged in ongoing management programmes in the area are interested in exploring opportunities to add PES components to their work. These include: (i) Tesu geog in Wangdue as a test site for improving and HP Punatsanchu HP I investment in watershed management, (ii) Bumdeling or Gamri to explore how to combine biodiversity conservation goals with rural tourism development opportunity with an improved watershed management focus. An additional option could be the ongoing management collaboration WWF-NCD in the Wangchuck Centennial Park, to pilot test NCD's forthcoming nature-based development framework in an integrated approach.

	name	sites	A	B	C	D- Rationale
(i)	Woochu (west Bhutan)	Woochu sub-catchment (Woochu and Jepthu villages)	1	2	X	<p>YES-</p> <p>Hydropower sector- potential buyer as woochu sub-catchment located in major area for electricity production (first plan in the country for the moment); although upstream from the buyer and only a tributary to one of the rivers flowing into the plant. However sub-catchment representative of all those feeding the Wang watershed feeding the hydropower plant).</p> <p>-ES status of sub-catchment good but lack understanding on land use change effects on water flow, particularly in winter (low water flow), the critical period for electricity production. Exist expertise -past watershed assessment (wang watershed management programme), ongoing research work in the sub-catchment including a strong monitoring component and on methodology and expertise developed in Bhutan on sustainable land management (SLMP).</p> <p>-The hydropower plant could already contribute to a trial phase (using mitigation fund for reforestation) and the government would contribute through additional studies and research.</p>

						-Local communities interested to get involved as well as local authorities.
(ii)	Puna Tsang Chhu	West bhutan	3			
1	upstream	Punakha-Chorten Nyebu village		4		NO PES at this stage as no buyer able to pay- except the government. trekking tourism is too small to be a viable buyer yet (on sinchula trek route) but could build on the experience of the Nabji Korfu community eco-tourism particularly on the farm-based tourism interventions and development of vegetable production for tourism and other local market (possible in Punaka and Wangdue towns) . The “buyer” of such studies would be the gov at this stage.
2	middle	Wangdue-Tesu geog and HP Punatsanchu HP I construction site		2	?	NOT PES as no buyer yet but could be in future as located in a future major area for hydropower production; although the sub-catchment is upstream from the buyer (hydropower construction further downstream on the Punatsanchu river. However sub-cathment representative of all those feeding the Punasanchu watershed and an area of important land degradation. Punasanchu HP project could invest some of its “impact mitigation money” to testing the feasibility of applying PES and target land-based interventions in Lyngmutedy chhu watershed feeding in the Puna Tsang Chhu. Existing expertise locally with the RNC-Bago research on the targeted watershed and SLMP approach. Local communities lack water access – need a water accounting study to assess the causes of the water scarcity – and if water or land based interventions would improve situation..
(iii)	Gamri (East Bhutan)	not visited because of time limitation and lack of buyer	3	?	?	NO PES at this stage - no buyer able to pay. The main “buyer” today is the government and the main objective would be rural livelihoods threatened by the land degradation -but recognized need for investing in ES -sustainable land management to limit erosion and sedimentation. .. In the future, hydroelectricity (planned downstream in 20 years) and tourism could be involved as the area is providing important water (gamri river), landscape (rich culture and landscape beauty) and biodiversity benefits (Sakteng wildlife sanctuary).
(iv)	Bumdeling East Bhutan	not visited at this stage	4			NOT PES at this stage as no buyer able to pay but recognized need for investing in ES -sustainable land management to limit erosion and protect black nest crane nesting area. The main “buyer” today is the government and the main objective would be rural livelihoods and conservation areas threatened by the land degradation. In the future, tourism could be involved as the area is providing important landscape (rich culture and landscape beauty) and biodiversity benefits (Bumdeling wildlife sanctuary). would need a water accounting and land degradation assessment to understand better what land and water interventions could help conserve the habitat for the black necked crane, as well as paddy farming in the “flood prone” area, and what compensation mechanism to establish if farming has to be changed. The “buyer” of such studies would be the government at this stage.
(v)	Yakpugang East Bhutan	Yakpugang and Kihirar villages, and upper sub-catchment	na	1	X	YES- direct link with buyer (Mongar municipality, and other city based water users) and local community interested to get involved and already actively protecting water sources (community forest area). However, before thinking of designing a PES scheme - detailed study on “water scarcity” may be financed by the government (MoWHS) as necessary to inform its long term water investments and understand the cause of water scarcity and whether land and water based interventions upstream would improve the water flow. This study would inform future investments of Mongar municipality for secured drinking water supply. and provide arguments for a PES scheme as the municipality is the potential buyer of that scheme ( through fee added to water bills, as well as “CF participation fee” to all large downstream users tapping water in the area managed by the community forest committee).
(vii)	Phobjikha	Phobjikha wetlands and upper catchment	2	1	X	YES- direct link with buyer (tourists, via local hotels), and already an action plan for the area focused on biodiversity conservation but including already livelihood improvement activities for the local communities. This plan is not yet funded. but a locally based NGO (RSPN) is already engaged in conservation activities in the valley. A PES mechanism would focus on informing landscape and biodiversity management investments of the Phobjikha valley in particular those targeted to farming land practices and diversification of income sources The buyers would be the tourism sector (through fee added to hotel

						bills, and additional voluntary contribution through RSPN, and an annual festival), the government to allow. RSPN for ecological interventions that may not directly interest tourism. Local communities interested to get involved as well as local authorities.
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**Notes**

- ranking- from 1- the most feasible to 4-least feasible at least in a short term
- A- Ranking done at the National PES Feasibility workshop:
- B- Ranking done after the field visit
- C- X Final selection for pilot sites – where PES mechanism could be tested (IV)
- D- Rationale for the selection

— **Suggestions for PES design in the three pilot sites**

The elements presented thereafter are preliminary ideas for each of the pilot sites of target groups, interventions to be supported through PES and optional institutional arrangements that could be considered when designing PES mechanism. This level of details was not necessary at the stage of a feasibility study but aims to inform the next phase –piloting- and keep track of the wealth of ideas that were discussed during the feasibility workshop working groups and field consultations.

→ **Pilot 1 – Woochu**

The communities within the sub-catchment are living highly dependant on water and forest resources. The lowlands are irrigated for paddy cultivation with up to three crops a year, while the upper areas are used for rainfed agriculture (up to 2 crops a year) and apple orchards. Forests are used for extensive grazing and collection of litter for compost, as well as a range of non wood forest products.

Both communities Woochu and Tesu are direct users and indicated a willingness to get involved in the protection of their watershed and be stewards of these ES they benefit from. The creation of a community forest on 600 ha of the sub-catchment will enable local sourcing and management of these resources (the Cf is currently being approved). The CF management plan will define rights, and obligations to use the forest resources, and specify mechanism for payment (fees), compensations (working days) and control (monitoring, fining etc). Use of CF based ES (forest products, and NWFP, as well a litter) will be regulated by the communities. However, water management is not included in the community forest management plan. Water users are located in the sub-cathment, and outside. The Woochu stream source is located in the state forest above the CF boundary in the upper part of the catchment (that area is not included in the proposed area for community forest) and is affected by grazing and logging activities according to communities. Communities would be willing to protect the water source provided it is included in the CF or if they are compensated for their interventions.

*Optional interventions to be supported through PES mechanisms*

Potential interventions of interest for the hydropower sector (objectives) would target the whole catchment area and aim at maintaining the quality of the watershed, at reducing pressure from current land-use practices (i.e. overgrazing...) and enhancing water infiltration and flood water storage in forest , farming land as well as paddy area. Many options could be explored. Some are indicated in table 4 and highlight the potential impacts on environmental services and benefits for the buyer and other Es users. The table 5 indicates where technical support and funding could be obtained for such interventions.

Table 4 : Identifying relevant interventions to maintain critical ES for HP

Objectives and Interventions	ES impacts	ES benefits
1- Forest in upper part of the catchment  Objective 1: maintain vegetation cover and soil stability, particularly in critical areas for water sources  → How: restriction of access in areas	Grazing management  - grassland zoning and improvements - destocking and compensation; plus breed improvements - Grazing ban in FMU rehabilitation	- global community (eg. private businesses interested in purchasing C credits with a rural development premium (eg CCB Standard)- enhance carbon sinks in soil (rehabilitation and management of



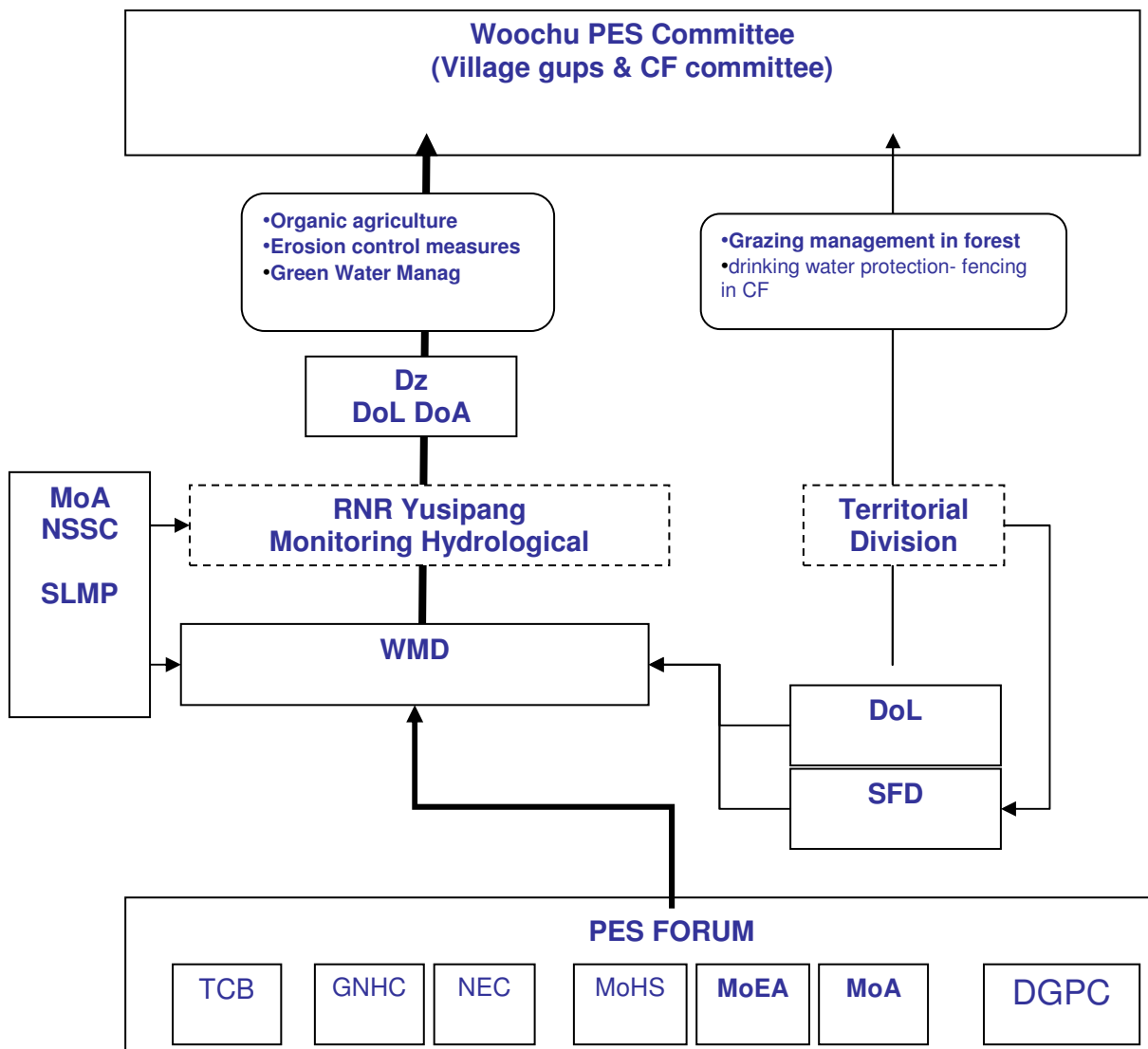
prone to landslides and restrict uses of areas around water sources in community forest plan, or agreed control by local communities if state land	areas Improved forest management and protection in Community Forest; reforestation in open areas if suitable Compensation- develop fodder alternatives development- live fences; improved grasses - water source protection with fencing	alpine soils)  - biodiversity conservation (by protecting the integrity of forest habitat and agro-ecological habitats)  – area of interest for nature tourism (trekking, and health/medicinal)
2- Farmland in upper part of the catchment  Objective 1: reduce risk of erosion → How: introduce conservation agriculture, and SLM practices to keep the soil on the fields  Objective 2: reduce risk of pollution of water → How: introduce low nutrient inputs farming practices and where possible organic farming	SLM Adopting green water management practices: mulching, cover crops (for when potatoes are done), hedgerows... (also with on-farm improvements in terms of soil moisture control in orchards); protection of natural soil fertility to reduce reliance on inputs) - improved water quality (reduce sediment, chemical)	- HP- avoided costs of sediment damage to micro-hydros; Possibly higher flows from improved green water  Drinking water (DW) users (Shaba army, schools, airport) - avoided costs water treatment or sourcing of alternatives  HP + DW possible increase in base flow, translated into increased production during low season
3-Wetlands in lower part of the catchment (paddy)  Objective 1: limit water use and land degradation risk but maintain flood control ability → How: manage irrigation systems and infrastructure to improve efficiency to cope with low water input in lean season, and control flood and soil loss otherwise	improved irrigation infrastructure and modernization of irrigation practices	HP, possible increase in base flow,  DW, more water available for use

Table 5– Technical Support and funding avenues for suggested interventions

Where	Support	Funding		
	Technical institutions	National- Government funding	Local- PES mechanism	Pilot project + other interested donors
1- Forest in upper part of the catchment	DoA-Livestock DoA-Forest SDF-CF Dz-livestock and Geog-livestock Dz- Forest + Geog-Forest  Other: NSRC-/SLMP RC-Yusipang	-support for improved fodder (i.e. hedgerows) and pasture -extension support on improved livestock and forest management -5 year plan (geog and Dz) -LT research	HP – Chhukha/Thala annual fund to community forest fund + compensation for restricted access/zoning of critical areas within state forest and grazing land	-training of local stakeholders for ES assessment and action plan,  -baseline water assessment to understand cause-effect of forest on water and modelling (WWF and SLMP interest in supporting hydrological modelling in Woochu)  -initial study to monitor impact of intervention on ES improvement, poverty, FS&N (SNV interested in supporting rural tourism development)
2- Farmland in upper part of the catchment  + 3- Paddy fields in low lands	National level DoA-agriculture, DoA-marketing unit National organic program  Local level Dz-Agriculture + Geog-agriculture Dz-environment, livestock + Geog-livestock	- training on conservation agriculture, on organic farming of local extension officers + farmer groups, -marketing support - farmers field visit - extension support on relevant SLM techniques - 5 year plan (geog and Dz) for supporting change in farming practice in LT, and LT monitoring on intervention impact. -LT research on crop and	HP – Chhukha/Tala annual fund to provide incentive to farmers to change framing practice in some rainfed land.	-training of local stakeholders for ES assessment and action plan, -incentives for introducing conservation agriculture (\$/ha) for first years  -incentives for introducing SLM measures at field level to capture  -initial study to monitor impact on ES, poverty, FS&N (SNV interested in

	<p>Other: NSRC-SLMP NRC-Yucipang</p> <p>Other: NSRC-/SLMP RC-Yusipang</p>	<p>pasture improvement</p> <ul style="list-style-type: none"> <li>-improving water use efficiency in paddy fields ( training on irrigation of local extension officers + farmer groups,</li> <li>-marketing support</li> <li>- farmers field visit</li> <li>- extension support on relevant SLM techniques</li> <li>- 5 year plan (geog and Dz) for supporting change in farming practice in LT, and LT monitoring on intervention impact.</li> <li>-timber subsidies, grazing fees</li> <li>-LT research on crop and pasture improvement</li> </ul>	<p>HP – Chhukha/Tala annual fund to provide incentive to farmers to control flood, use less water in irrigation and release more in stream.</p>	<p>supporting this learning process)</p> <ul style="list-style-type: none"> <li>-baseline water assessment to understand cause-effect of farm landuse systems on water and modelling (WWF and SLMP interest in supporting hydrological modelling in Woochu)</li> <li>training of local stakeholders for ES assessment and action plan,</li> <li>-farmers to farmers exchange on irrigation</li> <li>-incentives for improving irrigation efficiency at field level, and for infrastructure for first years</li> <li>-initial study to monitor impact on ES, poverty, FS&amp;N</li> <li>-baseline water assessment to understand cause-effect of irrigation land-use systems on water and modelling</li> </ul>
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Possible institutional arrangements in Woochu



→ **Pilot 2- Mongar**

Potential interventions of interest for the urban drinking water (objectives) would target the whole catchment area and aim at avoiding risks from current land-use practices (i.e. overgrazing...), and enhancing water infiltration and flood water storage in forest , farming land as well as paddy area. Many options could be explored (table 6,7).

table 6 Potential Interventions to be supported by PES mechanisms

- Catchment environmental services assessment to clarify critical areas for different services and inform a sub-catchment management plans (all land uses systems, including CF): zoning of sub-catchment with restriction of use (even for spiritual retreats...); settlements located in critical areas of the catchment: restrictions of use, practices or relocation
- Protect primary water sources located in Community forest (wetlands formed by upwelling groundwater, baseflow seepage from above and cloud condensation): Control human and cattle use of critical areas, and restrict access to core zone around the water sources must be established
- Increase in-situ water storage (soil humidity) and infiltration (enhance groundwater recharge and base flow in lean season)
- Make use of natural basins and waterholes to store excess water during wet season to supplement stream flow,
- create storage and increase soil moisture with water harvesting techniques
- in areas with high runoff in wet season and in farmlands
- Rehabilitation (SLM) and reforestation of degraded sites and open spaces within the sub-catchment area. land use zoning with temporary grazing prohibition in these areas to allow natural regeneration ; restriction of resource extraction ; replantation with native tree species (extension of CF management plan to open spaces
- Reduce erosion risks –SLM intervention and network of surface drainage canals and gravity conduits with flow checks
- Improve land productivity with land/water conservation measures, agroforestry practices; improved fertilisation; pasture development, orchards and plantations (Hazelnut ?);
- Capacity building and awareness raising to Incentivize and intensify community participation for stewardship and implement prudent measures for securing water resources
- Strengthen participatory monitoring capacity of the community to prevent over-exploitation of natural resources and enhance ability to act

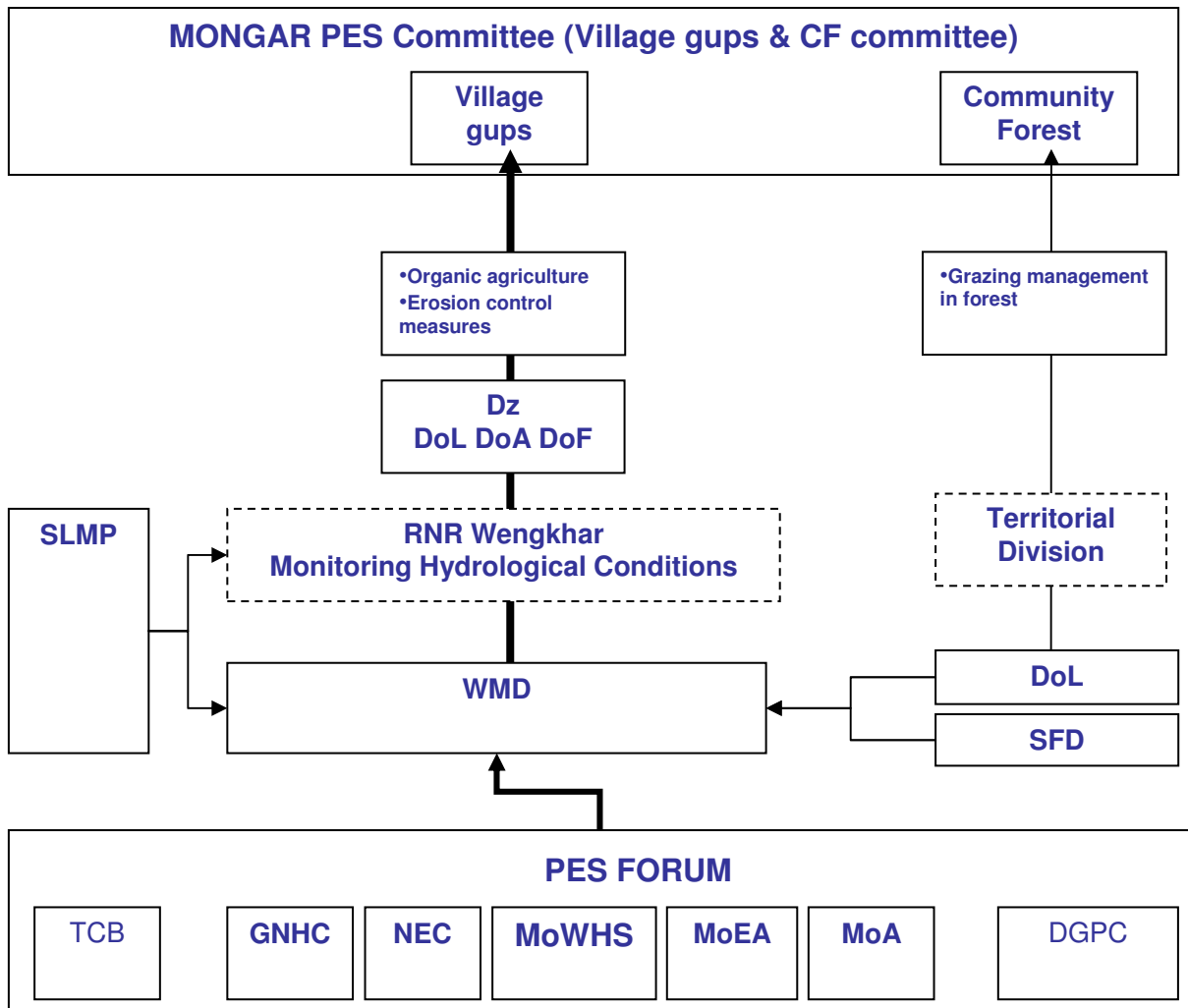
Other activities – relevant for service improvement but that cannot be covered by PES

- In all catchment-Avoid risk of land and water degradation:
- Mitigation of infrastructure environmental impacts, such as roads, electricity transmission lines, water development infrastructure (tapping, transport, storage and treatment infrastructure), as well as for irrigation canals etc
- discharge of chemical, pollutants in water (farming land, industrial activities,...)
- In municipality-Avoid risk of misuse of water and delay need to find more expensive water supply alternatives: Water Demand management limiting leakages and losses in the water transport, distribution networks and at user level (incentives for efficient water use appliances)...
- In settlements, municipality and in research station: Avoid pollution of water before tapping, but also after use (reduce options for future supply for the municipality):
- Waste water management (including process for pre treatment of dangerous waste, waste water use for agriculture, forest plantation etc. in urban and peri-urban setting.
- waste management strategy to limit risk of leakages from landfill (drainage, treatment), reduce waste at source, separate waste at sources with composting, reuse etc...)

Table 7 Activities and funding sources					
Where	Interventions	Support	Funding		
		Technical institutions	National- Government funding	Local- PES mechanism	Pilot project + other interested donors
1- Forest in upper part of the catchment	Objective 1: maintain vegetation cover and soil stability, particularly in critical areas for water sources  → How: restrict uses of areas around water sources in community forest plan,	DoA-Livestock DoA-Forest SDF-CF Dz-livestock and Geog-livestock Dz- Forest + Geog-Forest  Other: NSRC-/SLMP NRC- Wenkar,	-support for improved fodder (i.e. hedgerows) and pasture -extension support on improved livestock and forest management -training farmers for developing local base tourism services and products -5 year plan (geog and Dz) -LT research	municipality payment to Community forest fund for protection measures around water source	-training of local stakeholders for ES assessment and action plan  -initial study to monitor impact of this intervention on ES improvement, poverty, FS&N

<p>2- Farmland in upper part of the catchment</p>	<p>Objective 1: reduce risk of erosion  → How: introduce conservation agriculture, and SLM practices to keep the soil on the fields</p> <p>Objective 2: reduce risk of pollution of water → How: maintain organic farming in the rainfed areas</p>	<p>National level  DoA-agriculture, DoA-marketing unit  National organic program</p> <p>Local level  Dz-Agriculture + Geog-agriculture</p> <p>Other:  NSRC-SLMP  NRC-Yucipang, Bajo, Wenkar</p>	<p>- training on conservation agriculture, on organic farming of local extension officers + farmer groups,  -marketing support  - farmers field visit  - extension support on relevant SLM techniques</p> <p>- 5 year plan (geog and Dz) for supporting change in farming practice in LT, and LT monitoring on intervention impact.  -LT research on crop and pasture improvement</p>	<p>municipality and hospital fee to compensate upstream farmers for keeping “organic farming practices”</p>	<p>-incentives for introducing conservation agriculture (\$/ha) for first years  -incentives for introducing SLM measures at field level to capture</p> <p>-baseline water assessment to understand cause-effect of farm landuse systems on water and modelling RC-Wengkhar?</p>
<p>3- Wetlands in lower part of the catchment (paddy)</p>	<p>3-Wetlands in lower part of the catchment (paddy)</p> <p>Objective 1: limit water use and land degradation risk but maintain flood control ability  → How: manage irrigation systems and infrastructure to improve efficiency to cope with low water input in lean season, and control flood and soil loss otherwise</p>	<p>National level  DoA-agriculture,</p> <p>Local level  Dz-Agriculture + Geog-agriculture</p> <p>Other:  NRc Wenkar</p>	<p>- training on irrigation efficiency  - farmers field visit  - extension support on relevant techniques</p> <p>- 5 year plan (geog and Dz) for supporting change in farming practice in LT, and LT monitoring on intervention impact.</p>	<p>- municipality to compensate upstream farmers for irrigation opportunity lost (no water for paddy fields) or for lower water input in paddy in lean season,</p>	<p>-farmers to exchange on irrigation  -incentives for improving irrigation efficiency at field level, and for infrastructure for first years</p>

Possible institutional arrangements in Mongar



→ **Pilot 3 – Phobjikha Valley**

The area where the pilot will take place is a wide open wetland valley, at an altitude of about 3000m. Villages are located along the rim of the wetland and up the slopes into the forested slopes. Subsistence farming and livestock are the two main sources of income. Potato is the main crop (30% of the national production) and a crop where chemical inputs are high: households use 106 tons of sulphates and 55 tons of urea, or about 400Kg of sulphates and 200kg of urea per HH, per year (?). Only 99 HH use also organic manure; use of pesticides and herbicides is very limited (about 1kg) since its supply is centralized and the process cumbersome. Livestock grazes openly from the forest to the wetland, and are also stall fed with fodder produced in the farms (97%) and extracted from the forest. (RSPN, 2009).

Rain-fed cultivation of potato in the slopes draining into the wetland could be resulting in increased nutrient and chemical discharge, as well as increased sediment and muddy conditions which keep away livestock which in turn leads to overgrowth of bamboo in certain area- crane population feeds of fresh bamboo shoots. In order to reduce negative impacts from farming land reaching the wetland, the project could explore introducing sustainable agriculture, conservation agriculture and in some areas organic agriculture production methods. As an incentive for adoption, farmers would receive training, materials and priority access to local markets (hotels) as has been done elsewhere in Bhutan, with support from the national organic production programme of MoA (box 1).

**Box 1 Organic farming experience in Bhutan**

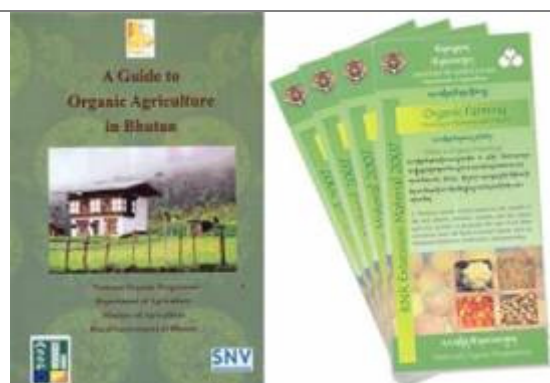
Bhutan National Organic Programme has prepared guidelines for low cost organic farming in Bhutan, and experiences are ongoing in various parts of the country.

The techniques include methods to increase soil cover and water infiltration (mulching), improve soil fertility (intercropping and organic manure) and preventing pests and diseases by adopting an ecosystem approach to farm management. Benefits include improved water management, soil conservation, lower production costs and long-term sustainability of the farming system.

In Bumthang, farmers have experimented with these techniques, and there are some indications that some already recovered their costs after one year- following an initial investment of Nu. 70,000, revenues have reached Nu.180,000 excluding the 4<sup>th</sup> harvest which was ready for sale at the time of writing (pers. comm. Offtg.DAO, 16/11/09).

Farmers contributed with labour during land preparation and building of water tank and cover the costs of hiring machinery and purchasing FYM. They also contributed with 25% of the costs of two greenhouse. MoA organic experts from the horticulture division provided training, materials for building of a water tank and greenhouse, irrigation pipes and seeds. While products are not sold at a premium price, production costs are considered to be lower due to less investment in inorganic inputs. Local communities and hotels are the main market.

While there is obviously a nich market for Bhutan Organic products, organic farming in Bhutan is not the solution to improve food security in the country. The main issue is that the “organic market” is not mature in Bhutan and it does not seem possible to sell organic products at a higher price. The recovery should therefore come from the fact that farmers spend less on inputs. The current MoA programme like most other extension programmes, relies strongly on subsidized inputs. For the moment, low external input farming seems the more viable option (and is practiced by most farming communities) as dictated by production and marketing conditions.



To download guidelines:  
[http://www.moa.gov.bt/moa/news/news\\_detail.php?id=718](http://www.moa.gov.bt/moa/news/news_detail.php?id=718)

Currently tourism services provided in the valley are limited but it is clear that tourism development opportunities will grow in the area, especially since the connection of the villages to the electricity network will be complete in 2010. Tour operators are enthusiastic about Phobjikha valley but the lack of suitable accommodation is a problem. From 2005 to 2008, tourism volume in the area increased from 529 bed-nights to 6,173 (from a total of 220,116 countrywide), due to the opening of one hotel in 2007 (Amankora Gangtey hotel, 8 rooms) and

another in 2008 (Dewachen hotel, 16 rooms), raising tourist stays to over 6,000 (RSPN, 2009). There are also three guesthouses, in traditional farm houses, offering 8 rooms each but tourists normally prefer staying in the hotels due to the better facilities offered. These are traditional Bhutanese farmhouses, richly decorated and comfortable, but in need of upgrades in tourist facilities. Given the building restrictions in the valley, and their architectural value, these houses present great potential to increase the local supply of services, and an important source of revenue to the local families. At the same time, they could offer good quality accommodation services at lower rates than the hotels, which could reduce overall costs to tour operators.

*Possible activities to be eligible for funding under the Phobjikha PES Fund (see also table 8)*

- training and marketing to improve sales of local tourism products and services
  - o grants for development to activities that generate additional income: farmhouse stay or meals along trek rest stops, local entertainment (cultural dance evenings etc)
  - o marketing strategies to communicate PES Fund investment priorities, results and new services offered
  - o development of tourism relations with Lungte village and local sourcing of yak products and other villages in the valley
- activities that maintain traditional features of the valley (eg renovation of buildings, using traditional techniques and materials (eg. covering CGI panel roofs with wooden shingles);
- support for community forest management (silviculture using techniques to reduce erosion) and reduce impact on wetland
- activities that improve farm management to reduce impact on wetland and improve food security and nutrition (organic production and diversification)
- development of activities that can help compensate for biodiversity conservation restrictions (eg. compensation for restricting grazing periods in wetland areas and forests);

table 8- possible interventions and institutional support for PES in Phobjikha

		A Agric; F Forest; L Livestock; DoR Department of Roads; MEA Ministry of Economic Affairs;	DW- Drinking water; HP- hydropower; C Carbon sequestration & storage; NC Nature Conservation; SB Scenic Beauty; MoA regular program; Disaster prevention	F- Forest &NWFP; FW- On farm water improvements; ID Income Diversification; FS&N; R Resilience
<b>Elements for ES provision sub- programme</b>	<b>Intervention</b>	<b>Lead sector</b>	<b>Main ES beneficiary</b>	<b>Rural Livelihoods Impact</b>
Water quantity (protection)	green water management techniques	A	HP DW	FW;R;FS&N
Improving vegetative cover -soil water storage and soil stability	Winter cropping	A	HP DW	FW;R;FS&N
	Orchard establishment + agro-forestry	A	HP DW	F
	Afforestation+mainte nance: state land	F	HP DW C	F
	Community forestry	F	HP DW C SB	F
	Private (group) forestry	F	HP DW C SB	F
water quality (limit land degradation)	Contour hedgerows	Any	HP DW	FW R
improving soil stability -limit erosion	Terracing – wetland, dryland	A	HP DW SB	FW R
	Zoning and regulation of	F	HP DW	FW R

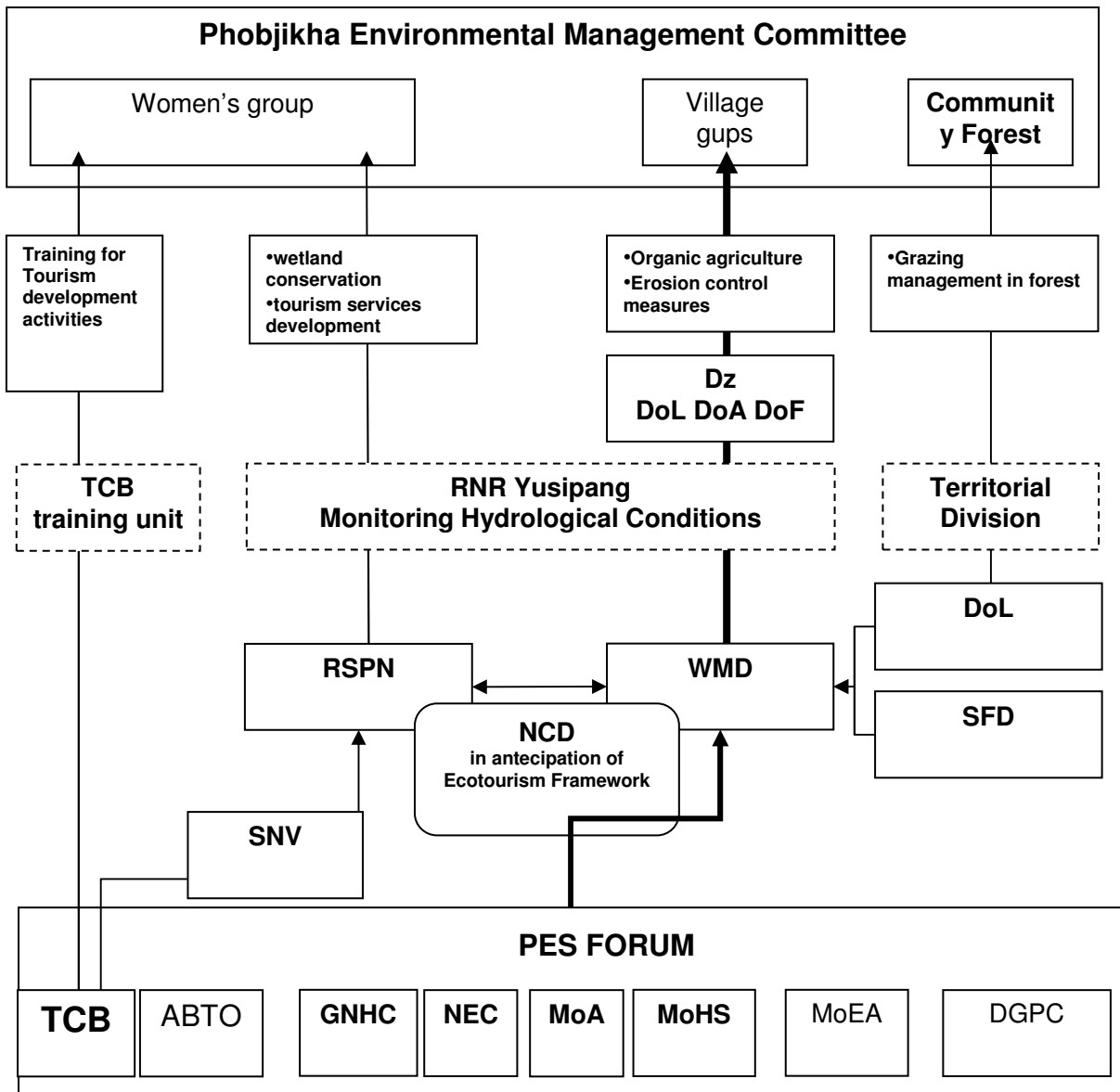


	sokshing (limit depth)			
	SALT establishment	A	HP DW	FW R
	Vulnerable/degraded land stabilisation (bamboo + tree seedlings)	A	HP DW MOA D	FS R
	Roadside stabilisation	DoR	HP DW SB MOA D	
Upland-Improving soil fertility of rainfed land	Low input Agriculture (natural Ag)	AL	HP DW C	FW FS R
	Grain legume cultivation	A	MOA	FS
	Legume cover crops in orchards	A	MOA	FW FS R
Improving grazing + fodder resources - limit soil and water disturbances	Reducing grazing pressure (artificial insemination (AI) + scrub bull castration)	L	HP DW C	R
	Fodder grass / tree seedling supply	L	HP DW C	R FS
	Group pasture establishment	L	HP DW C	R FS
	Zoning and regulation of forest grazing	L	HP DW C	R FS
	Forest fire prevention	F	HP DW C SB	R
Source: adapted from SLMP (2009)				

#### *Possible institutional arrangements*

While overall watershed management interventions could be led by WMD and its local MoA partners, Tourism-specific activities could be managed by RSPN, who has longstanding experience in the area, in collaboration with SNV and TCB. The existing Phobjikha Environment Management Committee already has the mandate to promote: “4.2 transparent accountable and harmonious socioeconomic progress in the communities with minimal adverse impact on the natural environment and critical habitats of the endangered species of birds and animals; and 4.3 an integrated development approach between environmental conservation and socioeconomic development in the communities” [Gangtey, Phobji and Bjena villages]

Possible institutional arrangements in Phobjikha



## — Institutional arrangements

### **Pilots offer the opportunity to inform the upscaling phase of PES on the potential mechanisms but also on the necessary institutional set up.**

This would require a strong national debate to identify the best institutional framework to support PES development and the setting of a national framework. Such a debate should involve the best placed institutions at cabinet level, probably with GNHC in a secretarial role. A possible next meeting point to proceed is the NEC, which already has several relevant sub-committees including one on water resources.

#### *Stakeholders to engage in a national debate on PES institutional setup*

Indeed, many institutions within and outside the RGoB demonstrated an interest in exploring PES mechanisms. Such stakeholders include:

- central bodies with a planning function as the GNHC
- relevant sub-committee under NEC e.g. one on water resources and which involves all relevant ministries including MoA and MoEA
- implementing departments within MoA especially:
  - a) WMD itself - for critical watersheds for water supply (drinking, energy, irrigation and water ecological needs eg. in wetlands)
  - b) NCD for critical biodiversity areas
  - c) SFD to incorporate other PES-relevant activities in CF plans
  - d) FRDD to explore options for forests for carbon benefits (including a, b and c above)
  - e) DoA and DoL for Agriculture Climate Change opportunities (eg. carbon sequestration in soils and methane emission reduction)
  - f) PPD to align watershed activities within the overall planning of MoA
- the sectors investing (MoEA (DGPC) and TCB (ABTO))
- as well as other organizations active in the field, such as NGOs (eg. RSPN in Phobjikha) and local organizations such as Community Forest Committees; technical programs as SLMP, and external partners who already initiated a reflection on PES in Bhutan such (e.g. SNV, DANIDA, ICIMOD...)

#### *What role could the watershed management division play in that setting?*

Among the interested stakeholders, the focal point for PES development at this stage is the newly created Watershed Management Division, within the Department of Forest. The Division has the mandate of planning and implementing basin-wide watershed management plans and considering that both water and forest proposed laws enable charging for watersheds environmental services, it can explore PES opportunities (box 2).

#### Box 2. PES- relevant roles of watershed management division as in watershed management Roadmap

- identify land uses with plausible causal connections with watershed condition (initially in critical parts of critical watersheds);
- prepare contractual agreements with upstream managers/land users for the provision of the services (by specifying WSM activities, quality standards and timelines);
- authorize the transfer of payments to the landholders subject to formal execution of agreements;
- supervise compliance monitoring to ensure that the agreed activities are being carried out; and
- report compliance and overall impacts investors (eg. DGPC, TCB, NCD...)

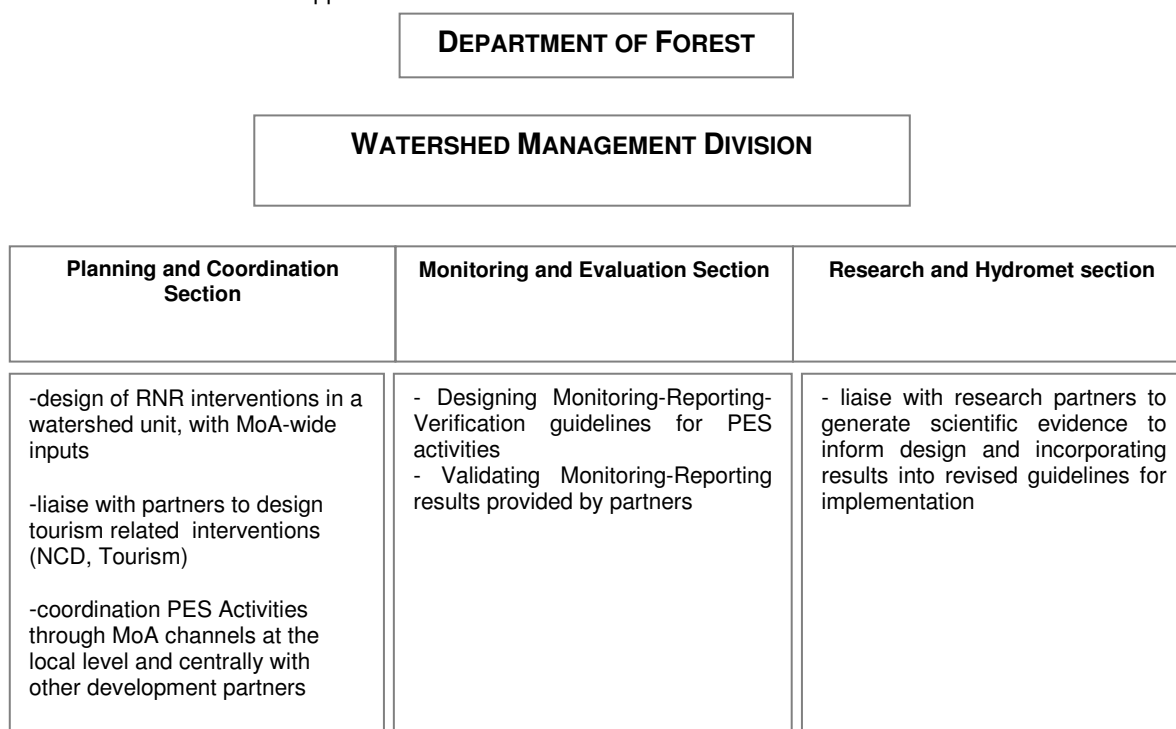
In addition, the National Roadmap for Watershed Management (RGoB, 2009a) suggests that stand-alone basin management plans are too costly and too easily sidelined to become effective. Instead the review team in charge of drawing this framework suggests mainstreaming and strengthening watershed management requirements into all Area Based Planning for all Land Uses<sup>35</sup>. This is also consistent with a PES approach in that it enables (RGoB, 2009b):

<sup>35</sup> "This approach involves strengthening and building upon existing area based planning and implementation capacity for all land uses in a Geog (and ultimately Dzongkhag). (...)These include the regular development plans of the Dzongkhags and Geogs as well as the land-use specific planning frameworks such those that apply to FMUs, protected

- “Embracing a multi-Agency and multi-Stakeholder approach to WSM planning, implementation and monitoring.
- Using adaptive learning and participatory land use management approaches to operationalise WSM at limited targeted watersheds / sub-watersheds and using learnings from these target sites to scale-up WSM across the nation.
- Harnessing the capacity of PES to both support WSM objectives and contribute to the enhancement of rural livelihoods and the reduction of poverty.”

Considering that investment would be made in improved management of RNR, the Ministry of Agriculture would be the main implementing agency. Within the ministry, one of the hub for PES coordination could be housed in the Watershed Management Division (WMD), who has the mandate to aligning NR management activities conducive to integrated watershed management, and is therefore well positioned to take the main intermediary role in the PES process. This year’s National Forest Conference, held in Zhemgang resolved that “different ongoing programmes of Department should be synchronized with the goals and objectives of the Watershed Management Division during its organizational development”<sup>36</sup>, therefore the timing is right to incorporate PES into WMD and other MoA planning in order to ensure long-term and meaningful institutional cooperation within MoA. This would be done in consultation with MoA Planning and Policy Division (MoA-PPD) in charge of aligning all MoA activities for 5 and 10 years plans.

WMD functions for PES support



**Pilots offers also the opportunities to explore PES linkages with two critical issues in Bhutan:**

- *securing food security*: The link between PES supported activities and their translation into food security has not been explored widely so far, and piloting would contribute to improve that understanding. As PES setting up may involve medium term investments (costs and risks) for the rural communities when acting as service providers (i.e

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areas, community forests, etc. Work with relevant Dzongkhag level Committees, to ensure WSM is integrated into all area based plans for all land uses in the district.” RGoB 2009,a

<sup>36</sup> DoF website, news section: <http://www.dof.gov.bt/node/7>

adopting new interventions or accepting to change land use practices). In that end, it would be important to analyse the livelihood conditions of the rural communities, as the main target group of the project and explore ways to engage also the vulnerable groups. The conditions for successful engagement in PES interventions in rural communities should be analysed in relation to the wealth and food security conditions. On this basis, the proposition for upscaling would propose improved food security links by targeting areas more food insecure.

- *supporting climate change mitigation*: Bhutan, as a land locked mountainous nation has important concerns over climate change implications on its NR basis, and in particular its water and forests resources. Although Bhutan is not considered the most vulnerable country in south asian level (ICIMOD upcoming study, Karma Tsering pers. comm.), the effects of climate change are perceived as a major threat to the Bhutanese economy, in particular for its HP sector, but also for its largely rural population highly dependant on national resources for agriculture. Bhutan heavily forested and largely undisturbed land areas represent a significant area for capturing carbon. However, at this stage the government has not yet defined its national strategy and roadmap as waiting for the decisions on the REDD+ mechanism. It is therefore too early to explore a case study specifically on carbon sequestration but they are potential areas for investments that would target food insecure groups.