COUNTRY PROGRAMME LANDSCAPE STRATEGY
COMDEKS, BHUTAN

RESTORING AND MANAGING LANDSCAPES IN *GAMRI* WATERSHED, TRASHIGANG

GEF-SGP/COMDEKS, UNDP, BHUTAN

NOVEMBER 2013

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1. Executive Summary

The Eastern Himalayas, which Bhutan is part of, is considered as one of the biological hotspots of the world. The Eastern Himalayas is also known as the 'Water Towers of Asia.'Rivers emerging from Eastern Himalayan Mountains provide water to over a billion people and contain the largest mass of ice outside of the polar region, giving its name 'The Third Pole'. Water is prerequisite for sustainable economic development, sound environment and social well-being. Water resources are already under immense pressure due to growing population and economic activities, which is further compounded by the negative impacts of a looming climate crisis. In the light of the above and to complement the implementation of SGP OP5 Country Programme Strategy, Bhutan has selected "Watershed" as the Priority Area/Landscape and Gamri Watershed in Tashigang as the site for the implementation of the Community Development and Knowledge Management for the Satoyama Initiative (COMDEKS) Project in Bhutan.

Gamri Watershed is located in the eastern region of the country with its boundary extending from 27° 13′ 49′′N to 27° 29′ 17′′N latitude and 91° 33′ 15′′E to 92° 01′41′′E longitude with an area of 745 km^2. The watershed spreads to eight gewogs (administrative blocks) of Trashigang Dzongkhag (province) - Sakteng, Merak, Phongmey, Shongphu, Bidung, Bartsham, Radhi and Samkhar. Gamri River is formed by over 19 tributaries originating from the above eight gewogs. Gamri River in turn is one of the main tributaries of Drangme Chhu which drains into Brahmaputra River in India and finally empties into the Bay of Bengal.

Gamri Watershed was selected as the pilot landscape of COMDEKS mainly considering its rich biological resources, and the growing pressures on the landscape from grazing, extraction of natural resources for fodder and fuel wood, landslides and drying of water sources. The landscape has been divided into three zones, namely, Zone I – Upstream, Zone II - Midstream, and Zone III - Downstream, based on the physical, ecological and social characteristics of the region.

Implementation of the Country Programme Landscape Strategy (CPLS) of Bhutan - 'Restoring and Managing Landscapes in Gamri Watershed,' is expected to result in: restoration of ecosystems, reduction of pressure on forest and natural resources, improvement in socio-economic conditions, diversification of livelihood opportunities, and enhancement of knowledge management and capacity of local institutions.

2. Background

Launched in 2011, Community Development and Knowledge Management for the *Satoyama* Initiative (COMDEKS) is a flagship programme of the International Partnership for the *Satoyama* Initiative (IPSI). The *Satoyama* Initiative is a global initiative to promote sustainable use and management of natural resources in socio-ecological production landscapes (SEPL) with the aim of maintaining, rebuilding and revitalizing them.

Funded by the Japan Biodiversity Fund setup within the CBD Secretariat, the COMDEKS project is implemented by UNDP, and delivered through the GEF Small Grants Programme (SGP), allowing for a fast, flexible, and proven mechanism to reach communities and civil society at the local level. As part of COMDEKS, small grants will be provided to local community organizations with the long term objective to enhance socio-ecological production landscape resilience by developing sound biodiversity management and sustainable livelihood activities with local communities to maintain, rebuild, and revitalize landscapes. The COMDEKS grant making is expected to generate key lessons on community-based best practices to maintain and rebuild socio-ecological production landscapes (SEPL) contributing towards the realization of the vision of *Satoyama* Initiative - "societies in harmony with nature".

COMDEKS implementation started with 10 countries in 2011: Brazil, Cambodia, Ethiopia, Ghana, Fiji, India, Malawi, Nepal, Slovakia and Turkey. In June 2013, the Government of Japan and UNDP launched the second phase of COMDEKS and 10 additional countries including Bhutan joined the global partnership in this phase.

Bhutan

Bhutan is a small landlocked mountainous country located in the southern slopes of the Eastern Himalayas. The country lies between latitudes 26°42´N and 28°14´ N, and longitudes 88° 44´E and 92°07´E with an area of 38,394 km^2. It is bordered by the Tibetan Autonomous Region of China in the North and the Indian states of Sikkim, West Bengal and Assam, and Arunachal Pradesh to its southwest, south, and east respectively. The country has a total geographical area of 38,394 square kilometres with a population of about 733,004 people as per National Statistics Bureau (2013).

The country is mountainous with a rugged and steep terrain, with altitudes declining from above 7,500 masl to under 200 masl within a short distance of 170 kilometres in north-south direction. The country can be divided into three broad physiographic zones. The southern belt is made up of the Himalayan foothills adjacent to a narrow belt of flatland along the Indian border with altitude ranging from under 200 masl to about 2,000 masl. The inner Himalayas consist of the main river valleys and steep mountains with altitude ranging from about 2,000 masl to 4,000 masl. The great Himalayas in the north along the border with the Tibetan Autonomous Region of China encompass snow-capped peaks and alpine meadows above 4,000 masl.

Bhutan has 70.46 percent of the total area under forest cover and 51.32 percent, secured as protected areas and biological corridors (DoFPS, 2011). Agriculture is the mainstay of the people with an estimated 69 percent of the population engaged in farming. Located on the southern slopes of the Eastern Himalayas, Bhutan is also part of the 'Water Towers of Asia,' and well-known for its rich biological wealth. Rivers emerging from the Eastern Himalayan Mountains provide water to over a billion people and contain the largest mass of ice outside of the Polar Regions giving its name 'The Third Pole' (ICCI, 2013). Fair spatial and temporal distribution of good precipitation on a rugged terrain with rich vegetative cover has endowed the country with abundant water resources. The major rivers are Drangmechhu (Manas), Punatsangchhu (Sankosh), Wangchhu (Raidak) and Amochhu. All the rivers drain into Brahmaputra River in India which finally empties into the Bay of Bengal.

3. Priority Area

3.1 Selection of the Priority Area/Landscape – Watershed

Under GEF-SGP OP5 Country Programme Strategy of Bhutan, 2010, one of the key interventions includes- "*Supporting community-based projects on watershed protection, sustainable resource utilization and management of timber and non-wood forest products including high altitude rangelands.*"In line with this, the National Steering Committee for GEF/SGP, UNDP in consultation with national and local stakeholders selected "**Watershed"** as the Priority Landscape and ***Gamri* Watershed in Trashigang** as the location for the implementation of COMDEKS in Bhutan. Water is a perquisite for sound environment, sustainable economic development and social well-being. Water resources are under pressure from a growing population and economic activities, which is further compounded by the impacts of climate change.

The COMDEKS Country Programme Landscape Strategy (COMDEKS/CPLS) is designed to complement the successful implementation of GEF-SGP OP5 Country Programme Strategy of Bhutan (GEF/SGP OP5-CPS). COMDEKS/CPLS will strongly support the implementation of the following four objectives of GEF/SGP OP5 CPS:

1. Mainstream biodiversity conservation and sustainable use into production landscapes, seascapes and sectors through community initiatives and actions;

2. Maintain/improve flow of agro-ecosystem and forest ecosystem services to sustain livelihoods of local communities;

3. Reduce pressures at community level from competing land uses (in the wider landscape) and

4. Support trans-boundary water body management with community-based initiatives.

3.2 Rationale for selecting *Gamri* Watershed as the pilot Landscape

Considering watershed as one of the key focus areas of OP5 Country Programme Strategy of Bhutan, and recognizing the identification of *Gamri* Watershed as one of the critical watersheds by the Royal Government of Bhutan requiring immediate interventions to address the mounting environmental problems, GEF/SGP, UNDP National Steering Committee, in consultation with the local stakeholders selected *Gamri* Watershed as the pilot landscape for the implementation of COMDEKS project. *Gamri* watershed is of high regional significance as it intersects the Sakteng Wildlife Sanctuary (at Merak and Sakteng) which is home to a number of globally threatened and endangered animal and bird species.

Owing to the environmental problems, caused mainly by landslides and over extraction of natural resources in the *Gamri* Watershed, a Watershed Management Plan was developed in 2009 by the Royal Government of Bhutan. However, its implementation was stalled due to lack of financial resources. The offer for Bhutan to join the second Phase of COMDEKS is therefore timely - providing an ideal opportunity to maintain, rebuild, and revitalize *Gamri* Watershed through development and implementation of sound biodiversity management and sustainable livelihood activities.

Despite immense local, national and global environment benefits provided by *Gamri* Watershed, it is plagued with serious environmental problems which include deforestation, overgrazing, drying of water sources, widespread landslides, soil erosion and loss of agriculture fields, flash floods and human wildlife conflict. The socio-economic problems within the watershed include lack of alternative livelihood opportunities, rural-urban migration, inadequate social infrastructure and degeneration of tradition and culture.

3.3 Location and Description of the Landscape

Gamri watershed is located in the eastern region of Bhutan covering eight *gewogs* of Tashigang - Sakteng, Merak, Phongmey, Radhi, Shongphu, Bidung, Bartsham, and Samkhar (Table 1). The watershed boundary extends from 27° 13´ 49´´N to 27° 29´ 17´´N latitude and 91° 33´ 15´´E to 92° 01´41´´E longitude (Figure 1) and has a total area of 745 km^2. *Gamri* Watershed is inhabited by about 32,464 people.

Table 1: Gewog Area and Percentage under the Watershed

Gewog	Area (ha)	% Area under *Gamri* Watershed
Merak	4974	11
Sakteng	34,150	71
Radhi	2867	100
Phongmey	10,121	94
Shongphu	9249	100
Bidung	4765	100
Bartsham	2605	74
Samkhar	5804	64
Total	**74,535**	

Source: Gamri Watershed Plan, 2009

Gamri Chhu (river) originates from Sakteng *gewog* located at around 4,000 masl and flows from a northeast to southwest direction converging with *Drangme Chhu* at an altitude of about 700 masl. *Gamri* River is fed by 19 major tributaries (sub-catchments) spanning across all eight *gewogs* of the watershed.

Gamri Chhu

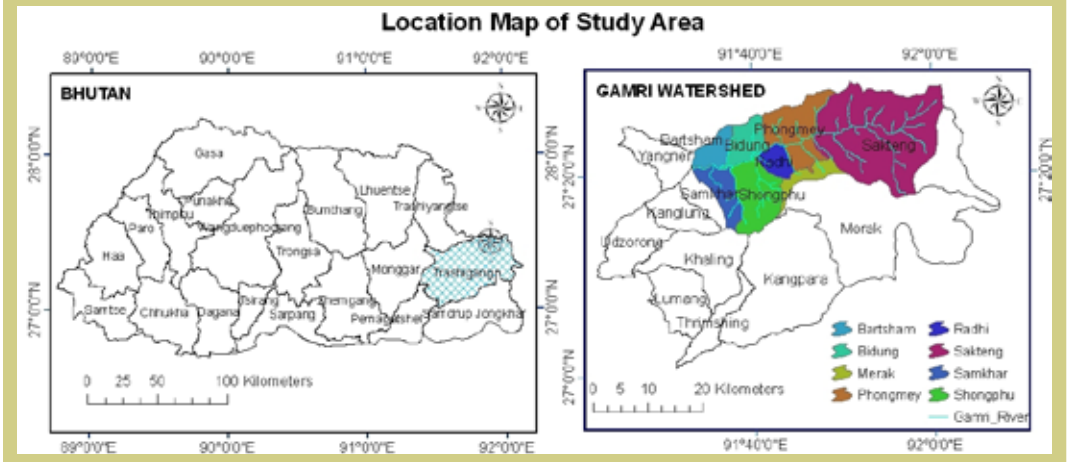

Figure 1: Location of Gamri Watershed

The altitude of the landscape varies from about 700 meters at the mouth of the Gamri River to almost 4,300 masl at the source (Figure 2). This has resulted in widespread variation in micro climatic condition, biodiversity, and agricultural practices. The watershed covers a diverse climate and ecosystems ranging from alpine, temperate to broad leaf forests (Figure 3 & 4). Land use types in the watershed consists of 69.3% forests, 15% natural pasture, 13.9% agricultural land and the remaining 1.63% is made of water bodies, rock outcrops, settlements and eroded areas (Table 2). Agriculture, livestock/yak rearing (Table 3 Livestock population of the watershed) and weaving is the mainstay of the people of the watershed.

Table 2: Land types in the Gamri Watershed

Land types	Area (ha)	% of area
Forest	51,440	69.3
Natural Pasture land	11,163	15.0
Agricultural land	10,363	13.9
Rock outcrops	654	0.88
Gully/Cliff	198	0.25
Eroded area	179	0.24
Water body	160	0.22
Settlement	30	0.04

Source: *Gamri* Watershed Plan, 2009

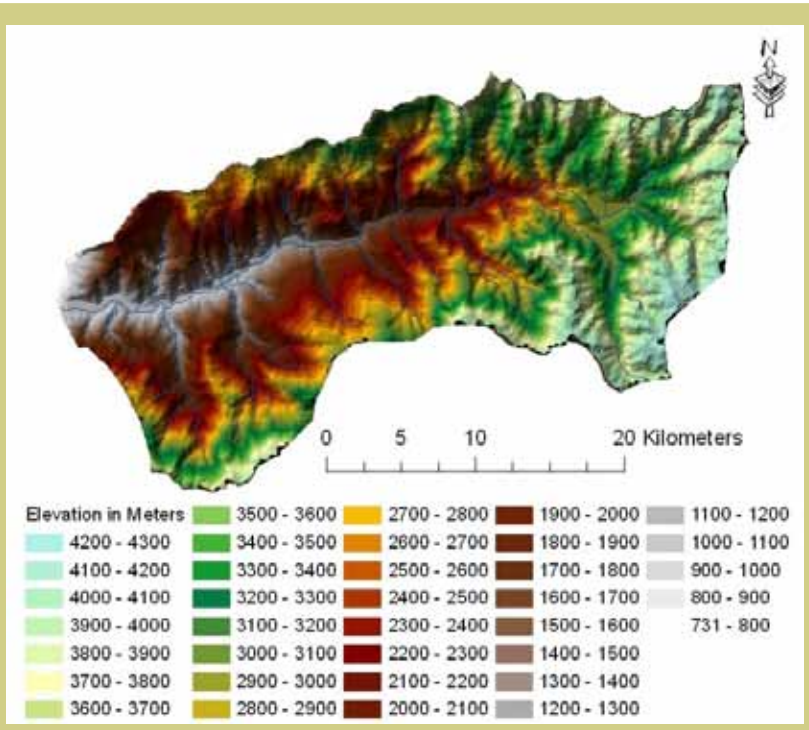

Figure 2: Relief Map of Gamri Watershed

Table 3. Cattle population in Gamri watershed (RNR Statistics 2012)

Gewog	Local cattle	Brown Swiss	Cattle Jersey	Yaks	Horses	Donkeys	Mules	Pigs	Poultry	Sheep	Goats
Sakteng	404	11	70	5809	655	26	1	382	11	954	49
Merak	6171	196	8	2,809	957	0	82	0	450	1115	24
Phongmey	1101	0	750	0	150	6	12	72	1353	26	13
Radhi	508	0	1090	0	364	3	60	3	1354	0	0
Bidung	0	0	238	0	0	0	0	0	0	0	0
Shongphu	607	0	686	104	77	0	10	93	2800	41	2
Samkhar	505	0	914	0	108	1	6	70	1362	50	38
Bartsham	560	0	751	0	55	1	12	4	791	0	22

Red panda (Ailurus fulgens), at Sakteng Wildlife Sanctuary. It is native to the eastern Himalayas and classified as Vulnerable by IUCN.

The Sakteng Wildlife Sanctuary (SWS), which has a total area of 740.60 km^2 intersects the watershed and covers almost three fourth of Merak and Sakteng *gewogs*. The SWS is representative of a diverse eastern Himalayan terrestrial ecosystem, consisting of alpine meadows, temperate forest and warm broad leaf forest. Out of the total 46 species of Rhododendrons in the country, the Sanctuary has 35 species growing in the wild and the sanctuary is popularly known as the "Paradise of Rhododendrons". The sanctuary harbours about 203 plant species including herbs, shrubs, and trees and is home to globally threatened and endangered animal species like the Red panda, Himalayan serow, Wild dog, Goral, Common leopard, Capped langur, Himalayan black bear, Musk deer and Jungle cat, to name a few.

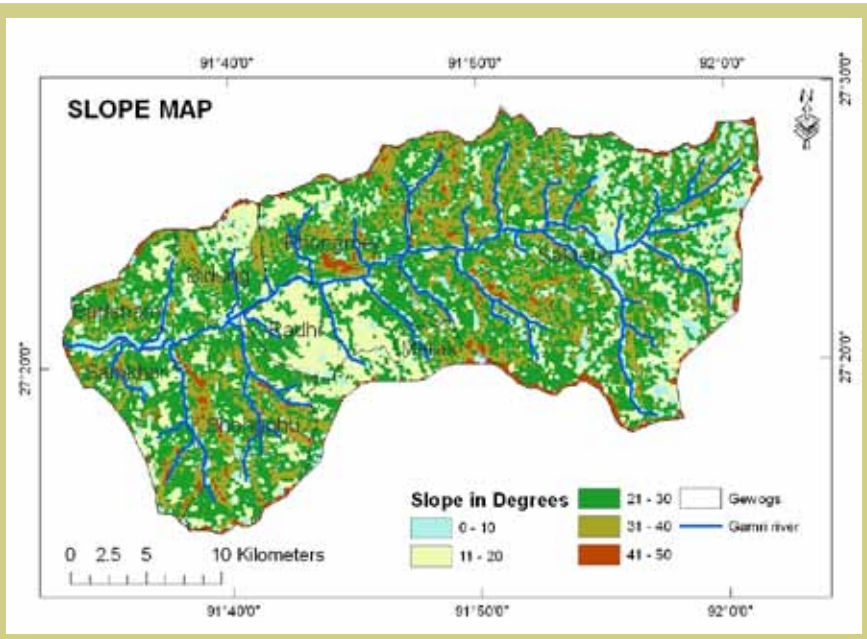

Figure 3: Slope Map

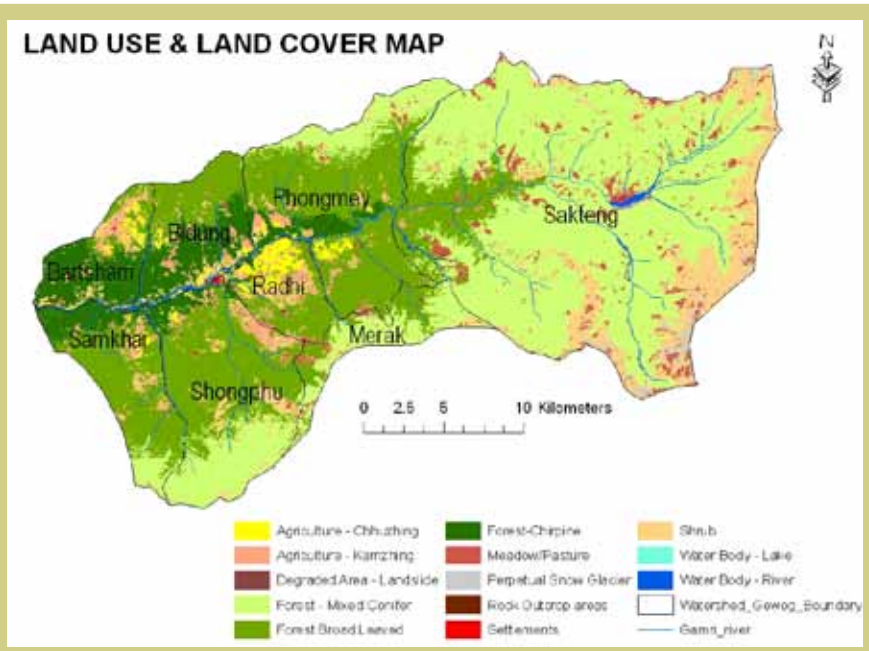

Figure 4: Land Use and Land Cover Map

Brokpa kids at Sakteng. Brokpas are ethnic population living in Sakteng and Merak

3.4 Classification of the Landscape

The physiographic characteristics of *Gamri* Watershed is such that it enjoys almost all the six different agro-ecological zones (AEZs) based on the classification by Dorji (1995). The criteria used for the classification of AEZ are altitude, temperature and rainfall (Table 4).

Table 4: Agro-ecological Zones of Bhutan

Agro-ecological zone	Altitude (m)	Temperature ^{0}C			Rainfall (mm)
		Max	Min	Mean	
Alpine	>3500	12	-1	5.5	<650
Cool temperate	2500-3500	22	1	10	650-850
Warm Temperate	1800-2500	26	1	13	650-850
Dry Sub-tropical	1200-1800	29	3	17	850-1200
Humid Sub-tropical	600-1200	33	5	20	1200-1500
Wet Sub-Tropical	150-600	35	12	24	2500-5500

Source: Dorji, 1995

Based on the above classification, along with the inherent characteristics of drainage system, agricultural activities, and problems associated with the watershed, the *Gamri* Watershed is divided into three distinct zones: Zone I – Upstream, Zone II- Midstream and Zone III- Downstream (Table 5;Figure 5 &6). The population in the *gewogs* falling within these three zones are given in Table 6.

Table 5: Zones within Gamri Watershed

Zones	Gewogs	Area (Sq. Km)
Zone I-Upstream	Merak & Sakteng	375.52
Zone II-Midstream	Radhi & Phongmey	130.57
Zone III-Downstream	Bidung, Bartsham, Samkhar & Shongphu	224.62

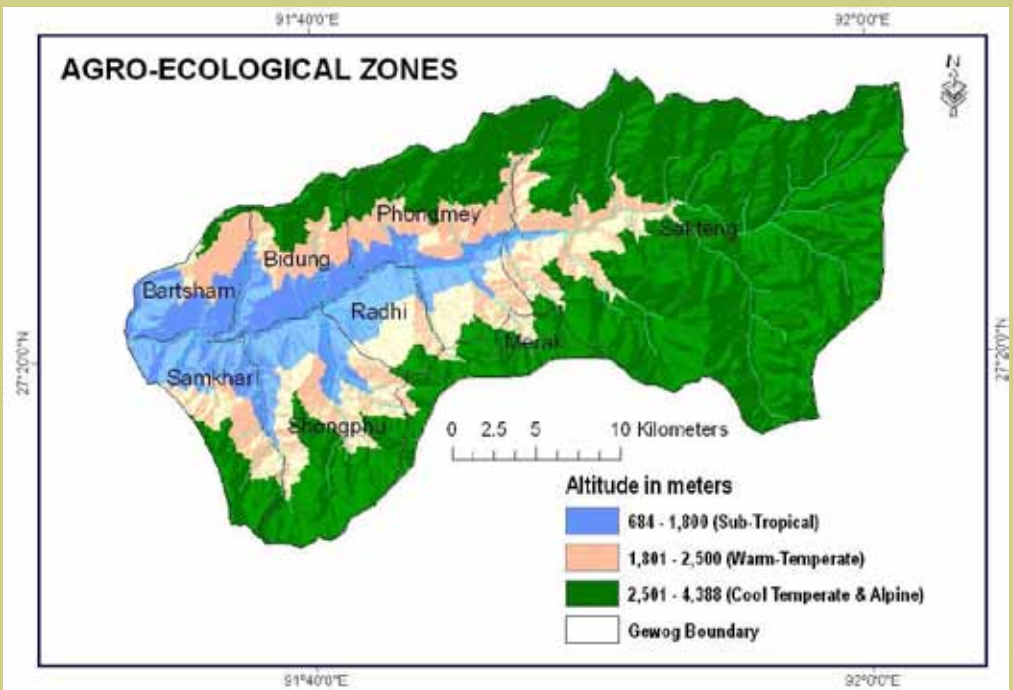

Figure 5: Agro-ecological Zones

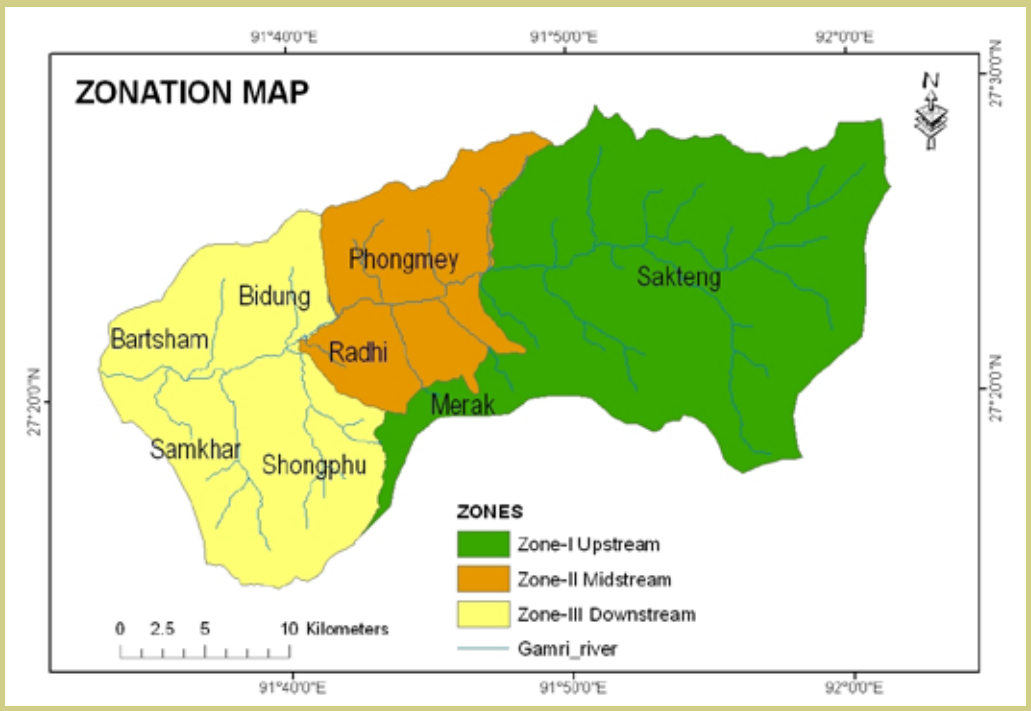

Figure 6: Zonation of the Landscape

Table 6:Population of the watershed

Parameter	Zone I		Zone II		Zone III			
Gewog	Merak	Sakteng	Phongmey	Radhi	Bartsam	Bidung	Shongphu	Samkhar
Population*	1957	2251	4428	5437	3465	3714	5433	5679

* *Source: www.trashigang.gov.bt*

4. Situation Analysis

4.1 Methodology

The *Gamri* Watershed Management Plan of 2009 provided critical background information in understanding the characteristics and environment problems of the watershed, including major interventions required in the area. To understand the current state of landscape and to identify interventions to develop sound biodiversity management and sustainable livelihood activities in order to maintain, rebuild and revitalize SEPL, a landscape-wide baseline assessment using SEPL indicators was carried out as per the guidelines for assessing SEPL Performance.

Participants carrying out scoring exercise during one of the consultation meetings.

Participants of the watershed level stakeholder meeting, held on 29 September 2013 at Ranjung.

Landscape-wide baseline assessment using SEPL indicators

A landscape-wide baseline assessment was carried out through a series of consultation meetings with different stakeholders covering the entire landscape from 18 August to 28 September, 2013. Field visits were made to Phongmey, Radhi, Bidung, Shongphu, Merak and Sakteng and consultation meetings conducted at respective gewog centers. The consultation meetings were participated by local elected leaders (*Gups, Mangmis, Tshogpas)*, communities and *gewog* agriculture/ forests/livestock extension staff. During the meetings, three qualitative methods were applied *viz. Satoyama* scoring exercise, focus group discussion (FGD) and participatory resource appraisal (PRA) to understand the state of the landscape and issues faced by the population.

The final workshop was held on 29 September 2013 at Rangjung (a centrally located town downstream of the landscape) chaired by *Dasho Dzongdag* (Governor) of Tashigang. The workshop was attended by over 65 participants representing all communities in the watershed, local leaders of all the eight *gewogs*, *gewog* staff and *dzongkhag* officials. In the process, more than 285 individuals were consulted to prepare the landscape strategy document. The results of the baseline assessment are presented below according to the classified zones of *Gamri* Watershed.

Merak Village, situated at 3500 meters above the sea level

4.2 Results of the Baseline Assessment

4.2.1 Zone I – Upstream

Zone I includes the two *gewogs* of Merak and Sakteng, which is inhabited by about 4208 people. The communities comprise primarily of nomadic yak herders - locally known as *Brokpas.* They have a unique tradition and culture including dress code. Cattle/yak rearing is the main socio-economic activity in Merak and Sakteng and this activity contributes to over 83% of the household income. Agriculture practice is minimal in these *gewogs* and some of the crops grown include buckwheat, maize and vegetables, including paddy in the lower part of the zone bordering Phongmey and Radhi. In order to secure food commodities like rice, maize and vegetables the *Brokpas* barter these commodities in exchange of dairy products, with the communities living in Zone II and III. Other essential goods and items are purchased from the shops in Ranjung from the income earned through the sale of yak and dairy products.

There are limited social infrastructure like roads, schools and hospitals. The nearest motorable road is about two to three days by foot. All goods are transported using potter and ponies. It is connected with the rest of the country with mobile network

and radio. There are five basic health facilities and two Community Primary Schools. With increased interaction with different people and culture in the neighbouring zones and the influence of modernization, the unique *Brokpa* tradition and culture is gradually deteriorating.

Zone I is highly significant as it is located upstream of the watershed and has the highest number of sub-watersheds. On the other hand, Merak and Sakteng have the highest livestock population (Table 3), which has resulted is severe land degradation due to overgrazing and deforestation from fuel wood extraction (for cooking and heating) and lopping of tress for fodder. Several landslides, ravines and gullies are a common feature in this zone. Large areas of forests, meadows and grazing areas are lost every year triggering serious consequences downstream.

Landslide area at Pangcom, Sakteng(Zone-I). Mainly triggered by overgrazing and lopping of tress for fodder.

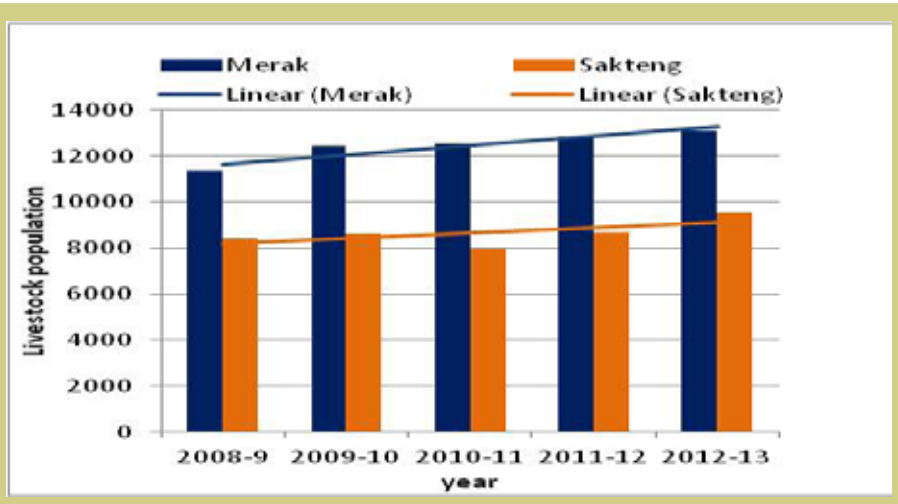

Figure 7 : Trend of livestock population in Merak and Sakteng

Bamboo huts are used by nomadic herders at various winter and summer grazing areas, competing with food resources of Red panda and other wild animals.

SEPL Performance of Zone-I (Upstream)

Figure 8 shows the results of the scoring exercise which was conducted involving stakeholders from this zone. The results support most of the situation discussed above and suggest that the performance of ecosystem protection is weakest followed by agricultural biodiversity and social equity and infrastructure with mean scores 3.23, 3.29 and 3.44 respectively. However, the score in knowledge, learning and innovation (4.4) is the highest, which may be due to the unique *Brokpa* tradition and culture of the zone.

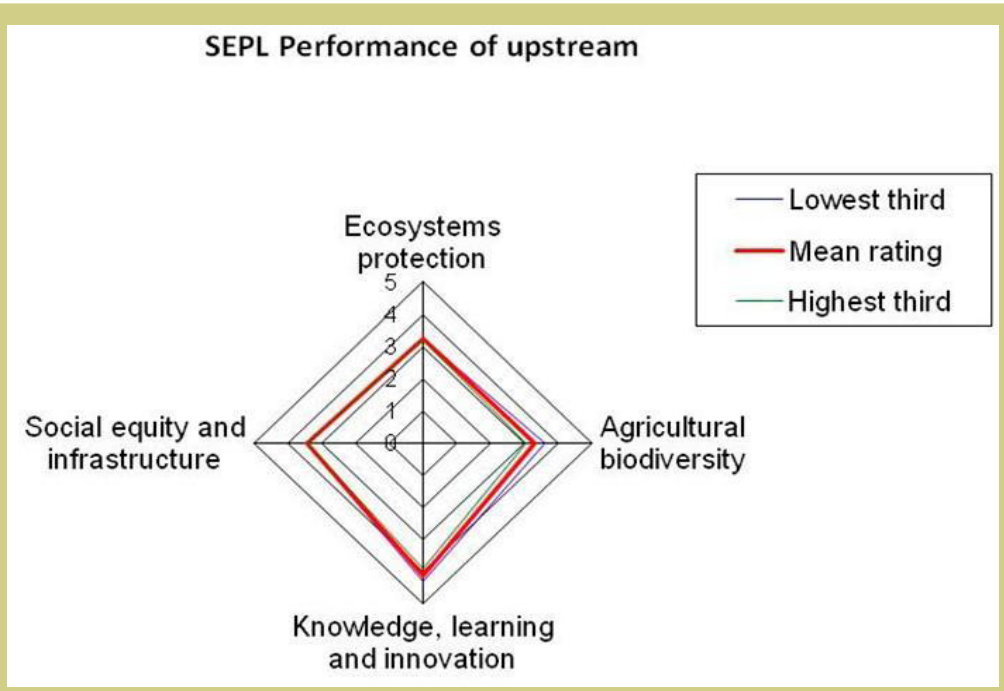

Figure 8: SEPL Performance of Zone I


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4.2.2 Zone II – Midstream

Zone II–Midstream comprises Radhi and Phongmey *gewogs*. It has a population of 9865 people. The major economic activity in this zone is agriculture and livestock husbandry. The main crops cultivated are paddy, maize, soybean, potatoes and vegetables.

The zone is known for grain production, mainly rice. Radhi is often referred to as the 'Rice Bowl of Eastern Bhutan' because of its fertile rice fields and grain production. Radhi is also famous for silk textiles (*buray gho* and *kira*). The main source of income is through sale of rice, vegetables, fruits and dairy products.

The two *gewogs* are connected by motorable roads, have access to electricity and good social infrastructure. It has seven Community Primary Schools and one Middle Secondary School; two Basic Health Units and seven Heath Out-Reach Clinics; and a number of monasteries.

Road to Phongmey damaged by Yudiri. Phongmey remains inaccessible most of the time during monsoons due to flash floods.

The major problems in Zone II are loss of agriculture land from flash floods (mainly triggered by overgrazing and deforestation in upstream – Zone I) and landslides during monsoons. In addition, farm roads are built with poor drainage system, thereby exacerbating the problems and causing loss of valuable and fertile agriculture land every year. Phongmey remains disconnected most of the time in monsoons due to the swelling Yudiri and Dungjuri which washes away big swathes of the farm road.

Human wildlife conflict is another major problem in this zone, including loss of traditional crop diversity. The crops are destroyed by wild animals such as porcupines, monkeys and wild boars causing huge loss to farmers every year. In some cases, agriculture lands are left fallow due to inability to cope with depredation by wild animals. In addition, the conflict over extraction of forest resources like timber, fuel wood and grazing rights between the people of Zone I (Merak) and Zone II (Phongmey and Radhi) is a long standing issue in the landscape.

Landslide at Karma Goenpa, Phongmey.

SEPL Performance of Zone-II (Midstream)

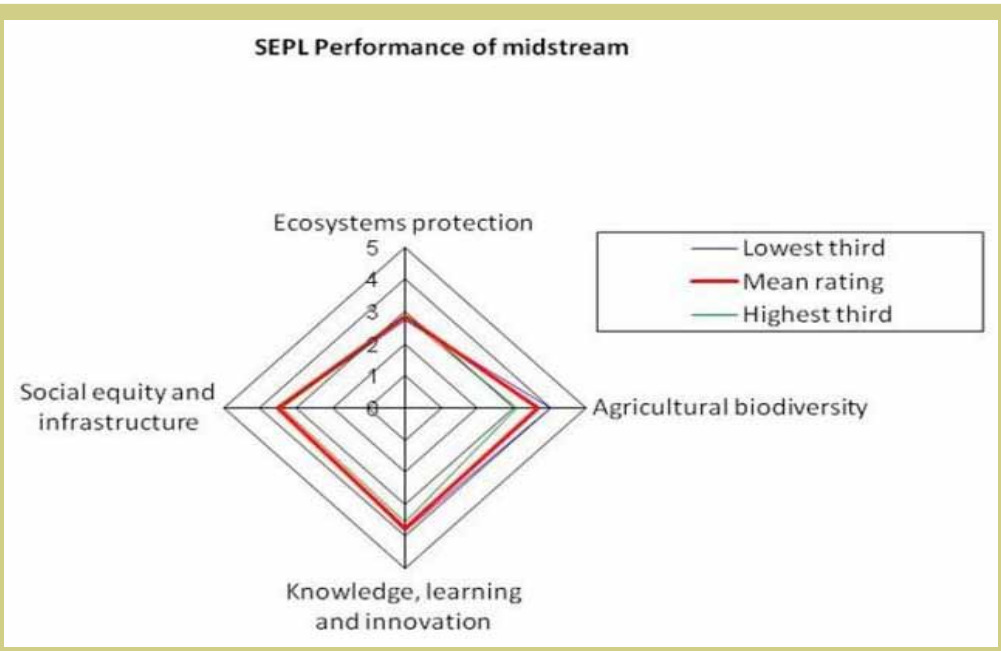

Figure 9: SEPL Performance of Zone II

The evaluation of SEPL Performance of Zone-II (Figure 9) with respect to four SEPL indicators suggests that ecosystem protection and maintenance of biodiversity are weak (2.86). The mean rating is highest in knowledge learning and innovation (3.75), followed by agricultural biodiversity (3.69), and social equity and infrastructure (3.50).

4.2.3 Zone III – Downstream

Zone III – Downstream covers four *gewogs* of Bidung, Samkhar, Shongphu and Bartsham. The total population of the zone is about 18291. As in Zone II, agriculture and livestock husbandry is the predominant economic activity in this Zone. Ranjung, the economic hub of the watershed is located in the Zone.

Maize is the major staple crop followed by paddy. Vegetables like potato, radish, beans and cabbage are grown in large quantities and sold to schools and nearby settlements for cash income. Additionally, livestock rearing is an integral part, providing almost all of the draught power and manure for agriculture production. Milk and milk products are a major source of household cash income of the population of this zone.

All *gewogs* in this zone have road connectivity and access to electricity. The zone also has good social infrastructures like schools and health care centres: four Basic Health Units, 13 Out-Reach Clinic Centres, one Higher Secondary School, one Middle Secondary School, four Lower Secondary Schools and 11 Community Primary Schools.

Ranjung town, the economic hub of the watershed

Saling village, Bidung Gewog

The key problems in this Zone are similar (to some extent) to Zone II, mainly in terms of landslides, flash floods and human wildlife conflict. The zone has additional problems of water scarcity both for drinking and irrigation, and frequent occurrences of forest fires during winter season- destroying large areas of chirpine forests. The people of Bidung and Bartsham are in constant conflict over water due to the acute shortage of water resources in the area. Large tracts of agriculture land are also left fallow due to lack of water and irrigation facilities.

SEPL Performance of Zone-III (Downstream)

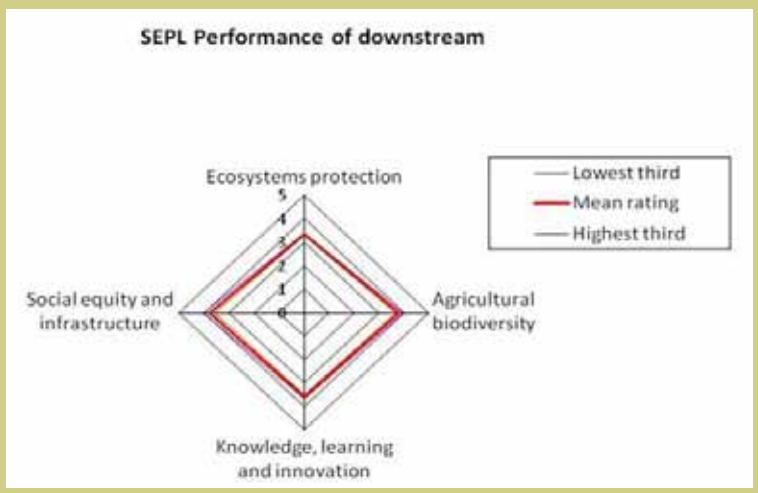

Figure 10: SEPL Performance of Zone III

The SEPL performance of the zone is illustrated in the radar diagram (Figure 10) developed from the mean rating provided by the diverse stakeholders of this zone. The SEPL rating is lowest for ecosystem protection and maintenance of biodiversity (3.34)- which suggests that it has weak ecosystem resilience. The mean scores for other indicators in ascending order are knowledge learning and innovation (3.59), agricultural biodiversity (3.78), and social equity and infrastructure (3.8).

4.2.4 Overall SEPL Performance of *Gamri* Watershed

The scoring exercise conducted in the three different zones described above had two main advantages. Firstly, through the exercise, the stakeholders were able to understand the objectives and goals of project. Secondly, the exercise also helped stakeholders to understand the situation and importance of SEPL of their respective zones.

Merak and Sakteng has the highest cattle population, and overgrazing is one of the key environmental problems of Zone I

In order to come up with SEPL assessment of the entire watershed, a final workshop, involving 65 participants from the three zones was held at Rangjung. All the three tools, *viz. Satoyama* scoring exercise, FGD and PRA that were used in the consultation meetings in different zones, were applied again to assess the overall performance of the landscape. Each score card completed by the stakeholders was individually punched in the Microsoft Excel template provided by COMDEKS to derive the radar diagram. FGD and PRA were also conducted to further investigate and get an insight on the outcome of the scoring exercise and to complement each other.

The result of the *satoyama* scoring for the watershed is presented in the radar diagram below (Figure 11). The mean scores indicate that the highest stress is on ecosystem protection and maintenance of biodiversity (with the lowest score of 3.13), which mirrors the results for the individual zones. As in the results of the individual zones, knowledge learning and innovation (3.63); social equity and infrastructure (3.66) and agricultural biodiversity (3.82) have better resilience.

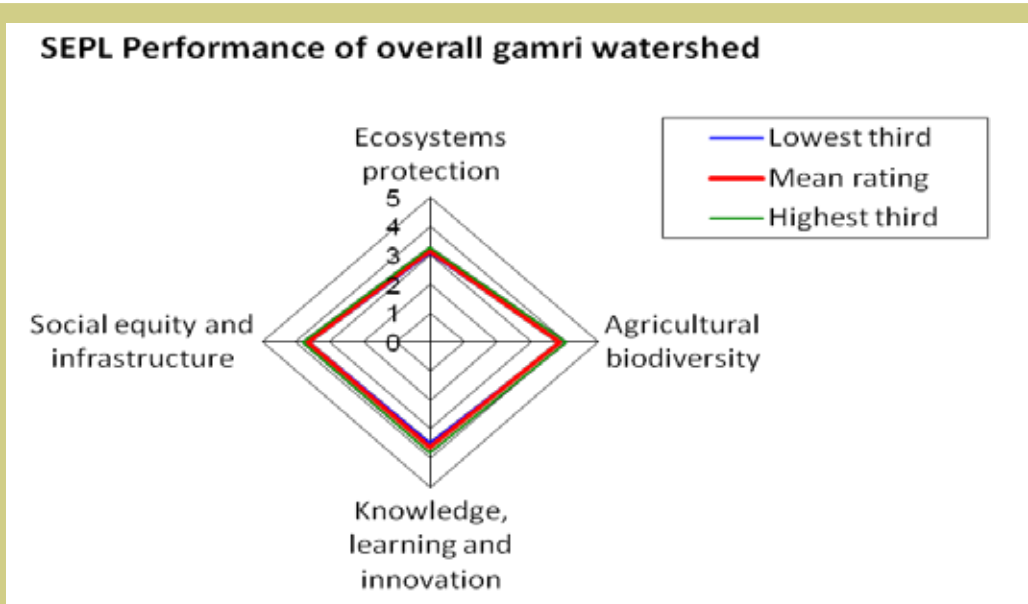

Figure 11: SEPL Performance of Gamri Watershed

4.3 Major Challenges of *Gamri* Watershed

The major environmental, economic and social problems of the landscape include:

a) Over grazing and land degradation due to a growing livestock population. The livestock population figures show an increasing trend over the years (relevant in Zone I, II and III).

b) Deforestation due to lopping of tress for fodder, fuel wood and timber (relevant in Zone I, II and III).

c) Competition over food resources of wild animals, mainly bamboo (used in roofing semi-permanent houses) which is a key food source for Red Panda (relevant for lower part of Zone I).

d) Frequent landslides causing huge loss of rangeland/natural pasture and agriculture fields (relevant in Zone I, II and III).

e) Flash floods, poor drainage system (in farm roads) and water management resulting in loss of limited and valuable paddy and maize fields (relevant in Zone II and III, more severe in Zone II).

Forest fires are a recurrent phenomenon in Trashigang

Stacked fuel-wood at Shytemi, Merak. Annually large numbers of trees are cut for cooking and heating.

Flash floods and landslides causing loss of fertile agriculture land in Zone II

f) Forests fires during dry (winter) season (relevant in Zone II and III)

g) Steep agriculture land with inadequate land management techniques, causing soil erosion, loss of fertility and productivity (relevant in Zone II and III, more severe in Zone III)

h) Degeneration of the unique traditional and culture identity of the *Brokpas* due to rapid socio-economic development and increased interaction with other communities (relevant in Zone I).

i) Scarcity and drying up of water sources both for drinking and irrigation, particularly in Zone III.

j) Human wildlife conflict and destruction of crops by wild animals causing huge losses to farmers (relevant in Zone II and III).

k) Limited livelihood and income generating opportunities (relevant Zone I, II and III).

l) Narrow genetic base of agriculture crops and loss of traditional crops and crop varieties (relevant in Zone II and III).

m) Recurrent competition and conflict over forest and pasture resources (relevant in Zone I and Zone II).

n) Low awareness and education on environment conservation and proper waste management. (relevant in Zone I, II and III).

Farm roads with poor water drainage system causing landslides and erosion

5. Landscape Strategy

5.1 General Premise

The vision of the *Satoyama* Initiative to realize "societies in harmony with nature" provides the fundamental essence for the development of the Landscape Strategy of *Gamri* Watershed. The Landscape Strategy endeavours to address major challenges (listed under 4.3) of the landscape through participatory and community based activities in order to maintain, rebuild and revitalize socio-ecological production landscapes in *Gamri* Watershed.

5.2 Goal and Objectives

The overall goal of the Strategy is to "Restore and manage the landscapes of *Gamri* Watershed for sustainable socio-economic development, enhanced resilience of ecosystems and wellbeing of the local population through cyclic and sustainable of natural resources; recognition of the value and importance of local traditions and cultures; and building capacity of local institutions and communities".

Specific Objectives:

a) Promote restoration and sustainable management of different ecosystems and landscapes;

b) Reduce pressures on ecosystems, landscapes and natural resources;

c) Enhance alternative livelihood and income generation opportunities; and

d) Strengthen knowledge management and capacity of community and landscape level institutions on sustainable use of natural resources and landscape management.

5.3 Expected outcomes, indicators and typology of projects

Outcome 1:*Degraded Landscape and Ecosystem of the Watershed Restored and Sustainably Managed for continued provision of Ecosystem Services.*

Indicator 1.1: Area and types of landscape and ecosystem restored.

Indicator 1.2: Number and area of ecosystem sustainably managed.

Typology of potential community based projects:

- Restoration of degraded rangeland/natural pasture through development of buffer and plantation;
- Stabilization of landslide areas through sustainable land management practices and plantation programmes;
- Protection and sustainable management of water sources, including restoration of lakes and marshlands;
- Establishment of Community Forests (CF) and enhancing effectiveness of the existing CFs.
- Promoting conservation and sustainable use of traditional crops and crop varieties.

Outcome 2: ***Pressure on Ecosystem, Landscape and Natural Resources Reduced for Enhanced Sustainability and Resilience.***

Indicator 2.1: Trend in livestock population of the watershed;

Indicator 2.2: Area brought under improved pasture and plantation.

Indicator 2.3: Number of improved/energy efficient options adopted.

Typology of potential community based projects

- Reduction of unproductive livestock population and promoting breed improvement;
- Development of improved pasture and fodder tree plantation;
- Improvement of drainage system and water management practices to protect agriculture land and forests;
- Promoting the use of fuel efficient heating and cooking stoves;
- Encouraging the use of alternative energy sources like solar energy, biogas, etc.
- Promoting sustainable land management practices (in agriculture fields with slope of over 50^{o}) to increase productivity;
- Measures to reduce Human Wildlife Conflict and crop depredation by wildlife; and
- Measures to reduce incidences of forest fires.

Outcome 3: ***Alternative Livelihood and Income Generation Opportunities Enhanced***

Indicator 3.1: Number and type of alternative livelihood and income generation opportunities adopted.

Indicator 3.2: Increase in household income as a result of supported activities.

Typology of potential community based projects:

- Exploring product development and marketing of Non-Wood Forest Products;
- Promoting establishment of private forests, orchards and organic vegetable production groups;
- Supporting women's groups on agro enterprises and handicrafts development; and
- Strengthening market chain for local goods and products.

Outcome 4: ***Knowledge Management and Capacity of Community and Landscape Level Institutions Strengthened to Enhance Landscape and Community Resilience.***

Indicator 4.1: Number of case studies and best practices documented and disseminated;

Indicator 4.2: Number of institutions or community groups engaged in integrated landscape management established or strengthened.

Indicator 4.3: Number and type of policies influenced at the local, landscape, and national levels.

Typology of potential community based projects:

- Documentation of traditional knowledge and practices associated with landscape and natural resources management, including preservation of local tradition and culture;
- Documentation and dissemination of best practices and lessons learned;
- Sharing of knowledge and lessons through exchange visits.
- Formation of Water Users Associations and capacity development on water management.
- Capacity building on development of improved pasture, SLM and community resources management.

Table 5: Strategy Outcomes and Indicator Log-frame

Outcome	Indicators	Typology of projects /Possible Interventions
Outcome 1 *Degraded landscape and ecosystem of the watershed restored and sustainably managed for continued provision of ecosystem services*	• Area and types of landscape and ecosystem restored. • Number and area of ecosystems sustainably managed	• Restoration of degraded rangeland/natural pasture through development of buffer and plantation. • Stabilization of landslide areas through sustainable land management practices and plantation programmes. • Protection and sustainable management of water sources including restoration of lakes and marshlands. • Establishment of Community Forests (CF) and enhancing effectiveness of the existing CFs. • Promoting conservation and sustainable use of traditional crops and crop varieties.
Outcome 2 *Pressure on ecosystem, landscape and natural resources reduced for enhanced sustainability and resilience.*	• Trend in livestock population of the watershed. • Area brought under improved pasture and plantation. • Number of improved/energy efficient options adopted.	• Reduction of unproductive livestock population and promoting breed improvement; • Development of improved pasture and plantation of fodder trees; • Improvement of drainage system and water management practices to protect agriculture land and forests; • Promoting the use of fuel efficient heating and cooking stoves; • Encouraging the use of alternative energy sources like solar energy, biogas, etc. • Promoting sustainable land management practices (in agriculture fields with slope of over 50^{o}) to increase productivity; • Measures to reduce Human Wildlife Conflict and crop depredation by wildlife; and • Measures to reduce incidences of forest fires.

Outcome	Indicators	Typology of projects /Possible Interventions
Outcome 3 *Alternative livelihood and income generation opportunities enhanced*	• Number and type of alternative livelihood and income generation opportunities adopted. • Increase in household income as a result of supported activities	• Exploring product development and marketing of Non-Wood Forest Products; • Promoting establishment of private forests, orchards and organic vegetable production groups; • Supporting women's groups on agro enterprises and handicrafts development; and • Strengthening market chain for local goods and products.
Outcome 4: *Knowledge Management and Capacity of Community and Landscape Level Institutions Strengthened to Enhance Landscape and Community Resilience.*	• Number of case studies and best practices documented and disseminated; • Number of institutions or community groups engaged in integrated landscape management established or strengthened. • Number and type of policies influenced at the local, landscape, and national levels.	• Documentation of traditional knowledge and practices associated with landscape and natural resources management, including preservation of local tradition and culture; • Documentation and dissemination of best practices and lessons learned; • Sharing of knowledge and lessons through exchange visits. • Formation of Water Users Associations and capacity development on water management. • Capacity building on development of improved pasture, SLM and community resources management.

6. General Criteria for Project Selection

In addition to the GEF-SGP general grant eligibility, GEF-SGP/COMDEKS project proposals should fulfil the following:

Eligible Applicants

1. Grassroots organizations/community groups applying for the grant should be recognized and endorsed by the local and provincial government;
2. Grassroots organization/community groups should have written by-laws for the effective operation of the group;
3. Project proposals should be accompanied by a list of elected Executive Members of the group and their contact numbers including Citizenship Card numbers;
4. Project teams may include one local technical staff as a member of the project implementation and evaluation committee; and
5. Projects should be implemented within the *Gamri* Watershed and should benefit more than 10 households.

Project Proposals

1. Project proposals should be aligned with the Landscape Strategy and directly contribute to achieving one or more outcomes of the strategy;
2. Project proposals should mainstream gender considerations and address gender issues where appropriate; and
3. Each project should include at least 10% of the budget to cover activities aimed at the production of knowledge management products at the landscape level (e.g. documentation of best practices and media clips or videos involving communities across the landscape)

Project Review and Approval

1. Call for proposals will be made twice a year (January and June) through radio, newspapers and provincial administration;

2. Project proposals should be routed through local and provincial administration for transparency and to avoid duplication of activities;

3. Project proposals will be first reviewed and screened by the Technical Committee of the National Steering Committee (NSC);

4. Project proposals screened and selected by the Technical Committee will be validated through field visits by the National Coordinator (NC) and where appropriate by the Program Assistant (PA); and

5. NSC Meetings will be held twice a year to further review and approve the proposals screened and recommended by the Technical Committee and also considering the field verfication reports of NC/PA.

7. Monitoring and Evaluation Plan

Monitoring and Evaluation at the Landscape level

Baseline assessment and development of the landscape Strategy has been carried out through consultative meetings, focused group discussions, participatory rural appraisal and the application of the *Satoyama* Scoring Exercise. Using similar approach, M&E at the landscape level will be carried out twice - once midway through implementation of the COMDEKS project and once at the end of the project. Landscape level knowledge management and output of annual project review and planning meetings will also provide information/evidence on the change and the state of the landscape.

Monitoring and Evaluation at the Project level

Individual projects will develop a practical M&E framework with activity level indicators aligned to Landscape Strategy outcomes and indicators. The project team will continually update the Monitoring and Evaluation framework with the activities implemented and outputs achieved.

Other means of monitoring and evaluation shall constitute:

Progress reports: Grantees shall submit physical and financial progress reports in the standard templates provided by GEF-SGP/COMDEKS as per the signed Memorandum of Agreement(s). The final report should contain detail project

activities implemented and contribution made towards maintaining, rebuilding, and revitalizing socio-ecological production landscapes in the *Gamri* Watershed.

*Field monitoring visits:*Project(s) visits will be conducted at least twice in its lifetime; initially after receiving the first progress report and towards the closure of the project. Financial spot checks will also be conducted where necessary and appropriate.

Case studies and stories: Grantees will produce case studies and stories of the project activities, best practices and lessons learned on a regular basis.

8. Knowledge Management Plan

Documentation and dissemination of knowledge generated from the project implementations is an integral part of COMDEKS to promote replication and up-scaling of successful on-the-ground actions to maintain and rebuild SEPLS.

The following knowledge management methods and approaches will be adopted:

1. Annual Review and Planning Workshop

The Annual Review and Planning Workshops (ARPW) will provide the much needed platform for various projects to present and showcase individual project progress, share experiences and lessons learned during a particular reporting period. During such ARPW, representatives from all relevant stakeholders like concerned government ministries, line departments and NGOs will be invited. Each project will present activities implemented during the reporting period along with impacts, lessons learned or constraints faced during implementation.

2. Farmer-to-Farmer Exchange

The projects will encourage visits to project sites by farmers' study tour groups from other districts or from within the landscape and other relevant government officials to directly interact with the grantees and beneficiaries. In this situation, the grantees provide direct feedback to such visiting groups and the groups learn from direct observation and interaction with the beneficiaries. This method provides

one of the best opportunities and options for knowledge generation and sharing between and among farmers especially those who are semi-literate or illiterate. Projects will be encouraged to allocate funds for farmers' tour as part of knowledge dissemination and sharing of experiences among different grantees and other interested parties and individuals.

3. Case Studies and Stories

Researchers, students and others will be encouraged to carry out case studies on COMDEKS projects and its contribution to SEPLS and package knowledge products including lessons learned for dissemination to wider audience. The media will also be encouraged to cover stories of COMDEKS projects and highlight the importance of maintaining, building and revitalizing SEPLS. Stories and news will also be posted on the Ministry of Agriculture and Forests website as well as UNDP/GEF-SGP website.

4. Participation in Knowledge Fairs

Project partners will be encouraged to participate in important events and knowledge fairs organized during important occasions like International Biodiversity Day, World Environment Day, etc. to showcase project achievements and disseminate lessons learned.

5. Brochures/VCDs/Mass Media

Projects will be encouraged to develop brochures which will be published and distributed to relevant organizations and individuals to disseminate experiences and lessons for replication and up-scaling.

A landscape level video on project implementation, benefits and contribution to SEPLS will be produced. Further, efforts will be made to garner support of Bhutan Broadcasting Service - the national television and Radio Programme and print media to highlight and run stories/panel discussion, etc. on successful projects as a medium to reach out to a wider audience.

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