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Note on **Green Growth** for **Bhutan**



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Glossary

ANS	Adjusted net savings
BRT	Bus-Rapid-Transit
CPS	Country partnership strategy
DOA	Department of Agriculture
DPL	Development policy loans
FAO	Food and agriculture organization
FDI	Foreign investment
FYP	Five Year Plan
GHG	Greenhouse gas
GLOF	Glacier lake outburst floods
GoI	Government of India
HP	Himachal Pradesh
MICE	Meeting, incentive, convention and event
RGoB	Royal Government of Bhutan
RNR	Renewable Natural Resources
RSTA	Road Safety and Transport Authority of Bhutan
SLCP	Sloping Land Conversion Program
SYB	Statistical Yearbook

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Introduction: What is the role for “green growth” in Bhutan?

Bhutan has recently made significant progress in sustaining economic growth and reducing poverty. In 2012, average per capita household income was somewhat under USD 2,400/year (Living Standards Measurement Surveys 2012). Growth has averaged around 9% per annum over the past decade and is expected to be on the order of 8% per annum over the next five years. According to the 2012 Bhutan Poverty Analysis, 12% of the population are what is known as “consumption poor”, half the number as compared to 2007. Furthermore, extreme poverty – defined as less than \$1.25/day in PPP terms – has fallen to only 2% of the total population. Bhutan has virtually eliminated extreme poverty within the living memory of one generation.

Bhutan’s population remains rural to a significant extent. According to a 2005 population census, 69% of the population lived in rural areas. And there remain significant income differences between urban and rural areas; average per capita household income in rural areas is estimated to be 28,000 Nu against 80,000 Nu in urban areas. There is, though, significant ongoing migration to population centers in search of increased opportunities. The 2005 urban population share of 31% of total population represents a substantial increase from only 5% in 1995.

Natural resource-dependent sectors play an important role in Bhutan’s GDP. Agriculture, livestock & forestry¹ account for 13.4% of GDP. The importance of agriculture in GDP is consistent with the continued high level of rural population, and it continues to be the sector that employs the majority of Bhutanese. However, annual growth in agricultural net output has been fairly low. It has been estimated that activity in hydropower directly contributes 12.5% of GDP, and up to 30% if one includes indirect impacts including construction. The contribution of hydropower to the economy is expected to grow over time as Bhutan faces increasing demands for hydropower exports to other countries in the region, and Bhutan still has significant untapped potential. However, employment generation in the hydropower sector inherently is low. Bhutan also has valuable deposits of primary materials including dolomite, lime stone, gypsum, quartzite, stone, and marble, which are useful for fabrication of other materials. However, its manufacturing sector is very small, consisting mainly of ferro-silicon processing using inexpensive energy. Finally, the tourism sector, much of the demand for which comes from Bhutan’s pristine natural environment, is becoming a more important contributor to export revenues in recent years. Thus, a significant part of Bhutan’s current and prospective economic gains come from use of natural resources – that is to say, “green” sectors.

Moreover, it can be said that green growth is at the heart of Bhutan’s development philosophy. Under its Constitution, at least 60% of the land area of the country must remain forested. In 2010, about 70.5% of the land was defined as under forest cover. The country’s Constitution (Article 5) and development plans over the years, including the recent 11th Five Year Plan, for example, also commit the Government to “... secure ecologically-balanced sustainable development.” Moreover, the country’s current Economic Development Policy incorporates several aspects of a green growth agenda, including:

¹ Together these sectors are called the Renewable Natural Resources sector.

- A continued focus on hydroelectricity, forestry, high-end/low-impact tourism, and agriculture as strategic sectors.
- A move towards banning agro-chemicals, and promoting export-oriented organic agricultural products.
- The promotion of environmentally friendly businesses and foreign investment (FDI) through green incentives (e.g., rebates in taxes and custom duties), and support for services in the areas of health, education, financial services, and tourism.
- A decision to make Bhutan carbon neutral, whereby the country's total emissions would not exceed the sink capacity provided by the policy-mandated 60% forest cover.

However, Bhutan also faces several ongoing development challenges. These include:

- Large macroeconomic imbalances created by hydro-power-led development as well as risks from dependence on a single buyer, India.
- Raising youth unemployment in part because the hydropower sector does not generate jobs commensurate to its revenue generating potential, but also other constraints to diversifying the economy, including limited transport and other infrastructure, complications in maintaining supply chains given its topography, skilled labor shortage, lack of financial capital, institutional barriers to new business development and small market scale.
- Fragmentation of agricultural land and stagnant or declining productivity.
- Increasing vulnerability to climate change particularly in the hydropower sector, the sector that is driving and will continue to drive economic growth.
- Persistence of human-wildlife conflicts, but also increasing tensions between siting infrastructure while maintaining Bhutan's forest cover.
- Rapid urbanization, which is straining municipal service provision and resulting in increased pollution with negative impacts on health, and raising concerns with the environmental performance of the mining sector.

The basic message in this Note is that Bhutan starts from a solid base in terms of green growth, with additional opportunities for meeting its development goals and overcoming the abovementioned challenges on the basis of its natural resource endowment.² However, realizing those opportunities and meeting those challenges will require focusing on the economic contribution from sustainable use of those natural resources, in addition to conservation of the environment. It will also require complementary measures, using the economic surplus (or as

² Note that we are not claiming that green growth, as we have sketched it here, is necessarily "optimal" in a conventional sense of maximizing the present value of physical consumption. It is however an important point of departure for discussing how Bhutan can make good use of its resource endowments within the framework set by its development philosophy.

economists refer to it, “rent”) from sustainable natural resource use to help diversify economic activity and address institutional and other constraints.

A traditional macroeconomic growth narrative sees green growth as a general call for increasing productivity, based on comparative advantages in natural resource use, and expanding different forms of capital investment to support economic growth, while maintaining safeguards to manage and reduce risks to the natural environment. A more comprehensive view of green growth emphasizes *sustainable use* of “natural capital,”³ along with managing environmental risks *cost-effectively* and in an institutionally sound manner to limit risks to human health and of irreversible degradation of the natural environment. In this context, green growth needs to balance conservation with sustainable economic use of all resources to meet the needs of the present, and maintain opportunities for the future. The need is to balance economic growth opportunities with quality of life goals, including environmental norms.

Building on these general observations regarding green growth, the Note takes stock of potential green growth opportunities in several sectors in the economy of Bhutan, as well as some cross-cutting environmental issues. Our discussions of the various sectors do not reflect detailed sector diagnostics, which are beyond our scope; nor do they provide specific prescriptive statements on policies Bhutan should adopt. Nor does the content of the Note reflect an in-depth analysis of how particular green growth possibilities would contribute to inclusive growth and poverty reduction; such a macro-level is also beyond our scope. The note touches upon issues of inclusion where possible but not in a systematic and comprehensive manner. Instead, the purpose of the Note is to provide food for thought in ongoing discussion of growth strategies for Bhutan, and how green growth ideas may contribute to that discussion. The sector discussions include examples of successful efforts in other places for sustainably increasing the economic return from natural capital and efficient management of environmental risks, as experiences from other countries for Bhutan to consider in its deliberations of options and challenges. At the end of each section we provide suggestions for next steps, drawing on the discussions at the stakeholder consultations in Thimphu in May 2014, to inform the on-going dialogue between the Royal Government of Bhutan and the World Bank on these issues.

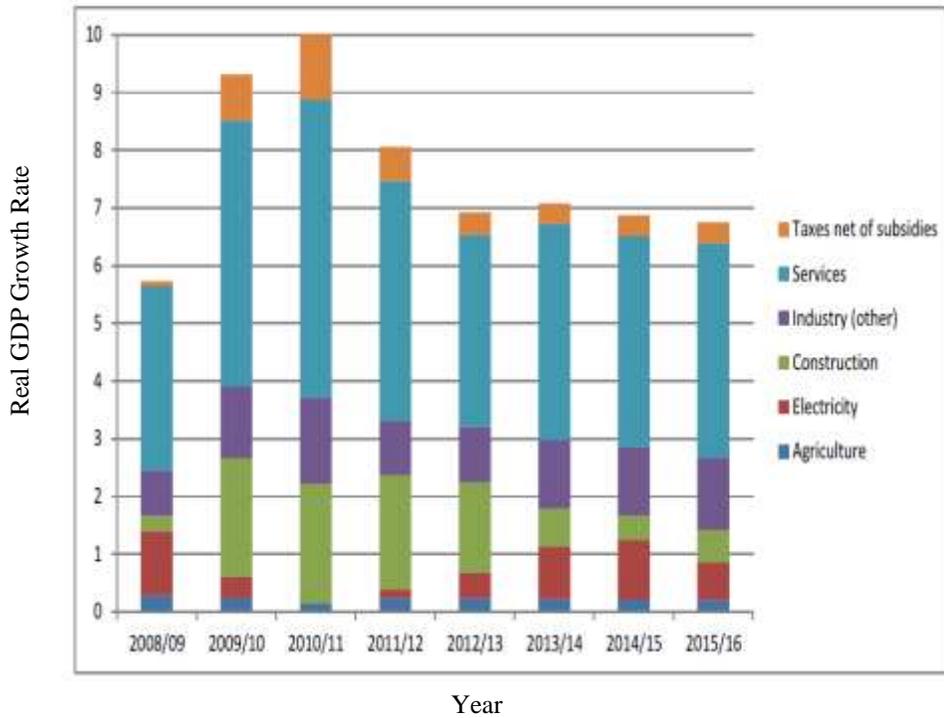
Box 1: Bhutan’s Macroeconomic Background

The figure below shows the breakdown of GDP growth rate by sector over the past five years and the same breakdown projected into the near-term future. Agriculture, manufacturing and mining sectors have grown at consistent rates over time: agriculture at a low 2 percent, manufacturing and mining maintained growth close to 12 percent.

With 75 percent of Bhutan’s imports coming from India and an exchange rate at par with the Indian rupee, Bhutan’s consumer inflation is intimately linked to India’s inflation. Food and beverages have the heaviest weighting in Bhutan’s consumer price index, at 36.9 percentage points, and since most are imported from India, they will continue to have the strongest impact on overall inflation.

³ Natural capital refers to the stock of natural resources that provide flows of valuable goods and services. Major types of natural capital include agricultural lands; subsoil assets (oil, gas, coal, and minerals); forests; water; fisheries; and the atmosphere.

Figure 1: Real GDP Growth Rate by Sector



Bhutan's current account deficit stands at about 25 percent of GDP, of which 10 percent are imports related to the hydro sector. Exports of minerals and mineral-based products account for more than half of total exports, with hydropower exports comprising a further 45 percent, and manufactured products a tiny 5 percent. India purchases almost 90 percent of Bhutanese electricity production. The tourism sector is becoming a more important contributor to export revenues in recent years. Tourism revenues are 20 percent of non-hydro exports.

International reserves amounted US\$920.8 million by end-November 2013, 88 percent of which was in convertible foreign exchange, with the rest in Indian rupees (or 13 months of merchandise imports). External debt is denominated in Indian rupees and is related to hydropower sector debt, which accounts for 61 percent of total external debt, with convertible currency debt accounting for 29 percent of GDP.

Donor grants and loans finance about 40% of the annual budget. Bhutan's public and publicly guaranteed external debt was 85 percent of GDP by end-FY12/13, up from 71 percent of GDP the previous year. The rise in the external public debt was driven in large part by hydro sector-related external borrowing (52 percent of GDP).

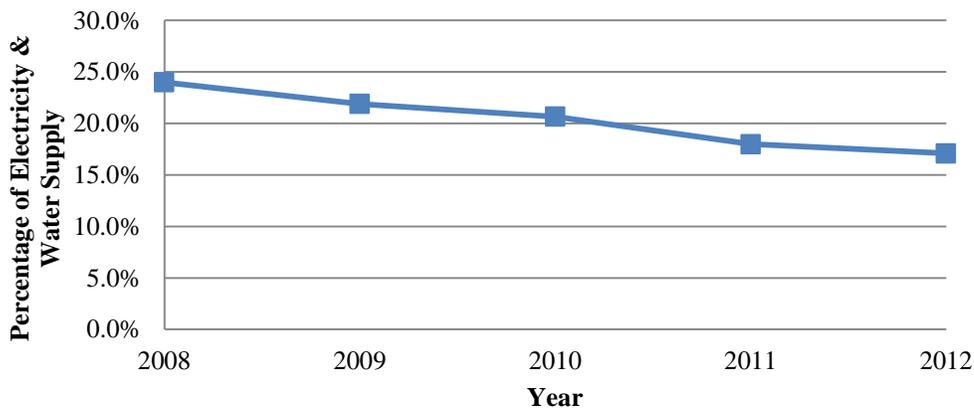
While total unemployment remains low at 2.9% (2013), youth unemployment was 9.6% in 2013 and is on the rise. In addition, there is evidence that underemployment is large, especially in rural areas. Hydropower directly contributes to 2 percent of total employment, whereas the majority of the population is still in agriculture, mostly subsistence, and the rest in services.

Source: Bhutan National Statistical Bureau

Hydropower

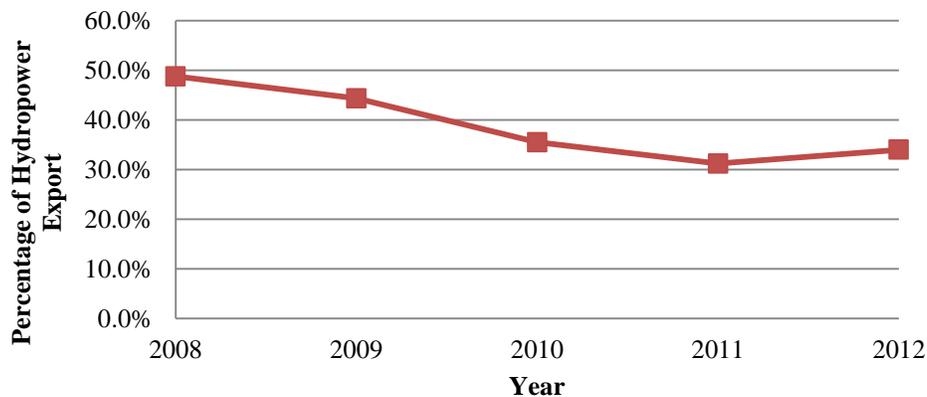
Hydropower is one of the most important economic sectors in Bhutan, both as the main supplier of electricity⁴ and as a major contributor to GDP (see figure 1). In 2012, the electricity & water supply sector contributed 17.1% of total GDP. Moreover, due to the commissioning of the Tala hydropower plant in 2006-07, the biggest in the country with an installed capacity of 1020 MW, real GDP growth increased to 21.4% in 2007 from 8.5% in 2006, with 17.2% of the 21.4% coming from the electricity sub-sector alone (Economic Development Policy, 2010). The sector is also an important foreign exchange earner for the country (see figure 2). In 2012, Bhutan exported 4924 MU of electricity to India and imported 36.75 MU (SYB, 2013).⁵

Figure 2: Contribution of Electricity & Water Supply in Total GDP



Source: Statistical Yearbook of Bhutan, 2013
 Note: GDP is expressed in constant prices.

Figure 3: Share of Hydropower in Total Export Earnings



Source: Statistical Year Book of Bhutan, 2013
 Note: The share is likely underestimated as the hydropower export only includes Chhukha, Tala and Kurichu hydropower facilities.

⁴ Diesel is also used to generate electricity but its share in the total is negligible.

⁵ Hydropower facilities are run-of-the-river and therefore subject to high seasonal variability. This gives rise to the need for Bhutan to import power from India in the dry season.

In 2012, the installed hydropower capacity in the country was 1,488 MW, about 5% of the total potential (11th FYP) of 23,760 MW. Bhutan plans to increase hydropower capacity to 4,546 MW and small hydropower plants capacity from 8,000 kw to 20,000 kw under the 11th FYP, and to reach 10,000 MW hydropower capacity by 2020.

Expansion of the hydropower sector will help contribute to revenue generation and economic growth. Expansion of this sector also promotes green growth in its broader sense as it allows Bhutan to increase the economic contribution of natural capital, in this case water and forests, sustainably while helping to displace dirtier forms of energy.

To realize its potential though the sector will have to overcome the challenges it faces. Because of high upfront investment costs, it is a challenge to raise financing for these projects. The Umbrella Agreement of 2006 and Protocol to the 2006 agreement with the Government of India helps to reduce this challenge. Meeting growing demand by households and industries, balancing domestic consumption and export earnings, and electricity cost and tariff levels are also other challenges, which will be relieved when new hydropower projects are commissioned. Large macroeconomic imbalances created by the sector also call for strong fiscal policy measures.

Furthermore, though the sector has reduced its environmental footprint and social disruptions with run-of-the-river facilities, further efforts to address the social and environmental challenges of large-scale hydropower expansion will help increase the efficacy of the hydropower facilities, as well as making growth in this sector greener and more inclusive. Managing watersheds in the catchment of hydropower facilities to maximize soil retention and water regulation services of forests, for example, will help increase the productivity of the hydropower facilities.

The hydropower sector also faces challenges due to climate change that are likely to be exacerbated in the future. Climate change assessments suggest that there is an increasing trend of precipitation-related climatic extremes in the region and Bhutan is projected to receive higher monsoon and post-monsoon precipitation. Between 1990 and 2009, glacial lakes in the Bhutanese Himalayas grew at 25-45 Ha/yr (Gardelle et al, 2010) and are likely to grow further due to temperature increases caused by climate change, leading to a threat of glacial lake outburst floods (GLOF). These findings lay risk to the hydropower sector. The projected increase in monsoon rainfall and rainfall extremes is expected to lead to additional sediment flow in already high-sediment rivers and thus to reduce live storage and turbine life of hydropower plants. GLOFs could damage or wash away small hydropower plants, and affect long-term viability of hydropower projects that are on rivers fed by glacial lakes.

Countries with similar potential for hydropower generation, but that face the threat of climate change, are starting to realize it through a combination of innovative policies and tools, including (also see Box 2: Promoting Environmentally and Socially Responsible Hydropower Development in Himachal Pradesh).

- Basin-wide scientific studies (also known as sectoral environmental assessments) to assess the cumulative impact of the development of hydropower projects in a cascade along the same river basin, to assess the efficacy of the different projects, the need for environmental flows downstream of the diversion structure to sustain ecosystem services

particularly during the lean season, and to assess environmental impacts to prepare and implement catchment area treatment plans at the basin level to manage soil erosion and ensure water regulation.

- Tools to assess the value of soil retention and water regulation services of forests in the catchment of hydropower facilities, to enable more efficient watershed conservation investment design to improve sediment management and design of payment for ecosystem service schemes. Implementation of new planning processes and incentive schemes based on these assessments.
- Adoption and implementation of national policies on environmental flow to ensure adequate river flows, based on the basin-wide assessments.
- Strengthening the capacity of the regulatory agencies to assess and monitor the environmental impacts (including monitoring e-flows) of hydropower projects and to ensure compliance of the rules and regulations by the developers. The regulatory agencies also need to be able to look at whether suitable planning and monitoring mechanism are available to ensure safe disposal of construction debris (i.e. muck).
- Development and adoption of benefit sharing mechanisms (such as annuity benefit sharing, making power available in the project zone) to ensure that communities negatively impacted by the hydropower facilities are adequately compensated, but also to ensure that the revenues generated support shared prosperity goals, economic diversification, and sustainable growth.
- Assessments of the potential impact of climate change on the hydropower sector and based on these, adjustments to the design of hydropower facilities to make them more climate resilient.

Box 2: Promoting Environmentally and Social Responsible Hydropower Development in Himachal Pradesh

Background: Himachal Pradesh (HP) is richly endowed with natural resources that provide economically valuable environmental services for much of the country. The state is home to three major river basins, and serves as a watershed that is critical to the livelihoods of more than 200 million people in Haryana, Punjab, Uttar Pradesh, and Rajasthan. It has one of the main sources of clean energy – hydropower - for the country that can help address both the energy and peak shortages of the Northern Region.

Government of India (GoI) sought a program of two DPLs to implement enabling policies, institutional actions and piloting of innovative practices to achieve inclusive green growth in the state of Himachal Pradesh:

- Adoption of environmentally sustainable and socially responsible hydropower development in the ongoing hydro development program;
- Integration of climate change adaptation and mitigation actions in policies and programs;
- Empowering local communities to promote watershed management;
- Promotion of an environmentally sustainable industrial development;
- Implement an environmentally sustainable tourism program;
- Instituting mechanisms for integration of spatial GIS based information in informed decision making.

Hydro Power Development Goal of DPL: In one of the pillar of the DPL operation, efforts have been

made to increase adoption of environmental and social parameters in hydropower development. Various important initiatives adopted in hydro sector are:

- GoHP has designed, adopted and implemented a web-based real-time monitoring system for project milestones, including those relating to environment and social parameters and environmental flows.
- GoHP has (i) carried out a cumulative environmental impact assessment study of the Satluj river basin; and (ii) developed a concurrent action plan. It has also initiated cumulative impact assessments across all rivers of the state.
- A basin –wide catchment area plan has been developed for Satluj basin and similar plans are in progress along all river basins.
- GoHP has adopted and implemented a benefit sharing scheme to complement the Local Area Development Fund, by initiating the payment of cash transfers to eligible beneficiaries.
- A communication strategy to disseminate hydro power development road map amongst the stakeholders has been developed.
- Technical studies on (a) institutional management of in stream flow, (b) InVEST Model to monitor performance management of catchments are also in progress to support the decision making and planning policy reforms.

Source: World Bank Staff

Given the low population density in Bhutan, and the migration out of rural areas, areas where hydropower plants are likely to be located, expansion of the hydropower sector is not likely to result in as large social or environmental impacts as would be felt in areas with higher population densities. Nonetheless, silt management in the upper catchment and ensuring sufficient e-flows downstream of the facility will still be important concerns, as will be concerns about the efficacy of individual projects. Furthermore, silt management will become more and more important as the country addresses its infrastructure deficit and builds roads to improve connectivity, given that road construction is one of the major contributors to increased sediment flow in rivers. A portion of the hydropower payments that Bhutan receives are earmarked for ecosystem protection, but recently those funds have been diverted to use for increasing “lifeline” electricity subsidies. This shift has implications for the environment. There may also be other environmental and social concerns, but identifying these would require further analysis.

Additionally, sector-specific policies may also be needed to make the hydropower sector more climate-resilient. To ensure reliable supply of water, there is likely to be a need to increase reservoir storage to combat increased hydrologic variability from climate change. Shifting to reservoir based facilities rather than run-of-the-river will however increase the potential environmental impacts and these will then have to be managed. Sedimentation management technologies will also need to be implemented, both in the catchment of the hydropower facility and within the facility to manage the impacts of climate change. These efforts will ensure that the hydropower sector contributes to economic growth today and in the future.

Given that Bhutan will continue to receive substantial and even growing revenues from hydropower in the future, it is important to consider how the country will manage these revenues, particularly to promote shared prosperity, and long-term development. Bhutan needs to carefully consider how far to go with “lifeline” electricity subsidies, since these leave less available for investments in growth-enhancing activities (or, as noted above, to reduction in expenditures for ecosystem protection). More generally, Bhutan needs to consider how to use its hydropower revenues for advancing economic diversification and employment enhancement activities. The more that is spent on privately or publicly provided (nontradable) services, or

imported goods, the lower is the volume of savings for increasing various forms of durable capital (and the costlier is labor in other potential export-oriented sectors). There is thus a degree of tradeoff in how Bhutan wants to see its economy further develop in terms of growth in labor-absorbing services and other sectors like manufacturing. While further hydro development will generate resource rents, the extent to which these rents stimulate further growth will depend on the policies for their use.

To summarize, the hydropower sector is and will continue to be one of the most important economic sectors in Bhutan. To support this sector and deal with the challenges it faces, there is a need to articulate and adopt a policy on hydropower revenue use and revenue sharing to ensure that revenues are used to promote growth and shared prosperity in a manner that is sustainable. Furthermore, development of capacity to use tools to manage watersheds to maximize the flow of ecosystem services, in particular soil retention and water regulation services, such as ecosystem accounting, watershed investment prioritization tools, etc., will also be important. This will help manage the current issues with silt as well as potential issues that will arise due to infrastructure development and climate change. Finally, it will be useful to examine the potential role of payment for ecosystem schemes to meet both revenue sharing objectives and to deliver ecosystem services.

Forestry

Forests are an important natural resource in Bhutan. The Constitution of Bhutan stipulates that the country maintain a “minimum of 60% of the total land under forest cover for all times to come”. In 2010, in fact, forests accounted for 70.5% of the total land area, and an additional 10.4% was under shrubs (SYB, 2013). Broadleaf and mixed conifer forests are the major forest types. However, only about 14% the forest lands are economically accessible and available for production of commercial timber (National Forest Policy of Bhutan, 2010).

As a share of GDP the forestry and logging sector accounted for only 3.1% in 2012, however. This figure though does not represent the importance of the sector in the livelihoods of the poor: rural people strongly rely on forests for subsistence goods, including fuel wood, non-wood forest products (NWFP), construction timber, etc. In Bhutan, firewood constitutes about 57% of total energy consumption. Households account for 95 % of total fuelwood consumption, while the government, commercial sector and industry consume the balance (Uddin et al. 2006). Between July 2008 and June 2011, about 160,000 cubic meters of firewood have been supplied at subsidized rate to rural communities. During the same period, the entire commercial firewood production of the country stood at about 100,000 cubic meters. Apart from firewood, data from 2007/08 show that stones and sand are the most important NWFPs followed woodchips, bamboo, resin, and cordyceps. And many of these uses of the forests are often not fully reflected in the national account estimates.

Though deforestation is not considered to be a major problem in Bhutan, urban expansion and the establishment of new infrastructures such as roads and hydropower projects have had an effect on forests. Over 8,900 ha of Government Reserve Forests (GRFs) land was allotted for such activities by the Department of Forest and Park Services (DoFPS) between FY 08/09 and FY 10/11, with an increasing trend. Forest fires also contribute to deforestation. Records show about 62 forest fire incidences annually in the last 15 years, leading to damage of approximately 18,188.23 acres of forest lands per year. Another potential challenge, and one that is particularly relevant for promoting green growth in this sector, is low productivity. Surprisingly, wood charcoal was one of the top ten commodities imported into the country from 2008 to 2012, despite the large areas under forests in the country. Aside from productivity differences, this appears in part to reflect reluctance to accept the nearby presence of charcoal kilns.

Under the 11th FYP, Bhutan hopes to overcome some of these challenges and manage its forest resources for supplying economic goods and services through the establishment of Forest Management Units (FMU), Working Schemes (WS), Community Forests (CF), plantations and NWFP user groups. The numbers of CFs in particular are to be increased to help empower rural communities to manage forests sustainably and achieve poverty reduction (Royal Government of Bhutan, 2010a). The 11th FYP also emphasizes biodiversity conservation and the maintenance of ecosystem services through protected area management, watershed management and wildlife management. Bhutan is also conducting REDD+ readiness activities, and hopes to be ready for implementing REDD+ activities by the end of the 11th FYP by which time it is hoped that there will be clarity on the availability of global funds to support these activities.

As with other sectors, these policies will help make growth green and inclusive. Another crucial element of promoting green growth in renewable resource sectors such as forests is to

ensure that the resource is managed to enhance productivity and prevent resource rent dissipation, given its common property nature. A package of measures is often needed to realize green growth outcomes: to reap higher and sustainable economic returns from natural forests, for example, requires aligning policies, incentives, capacity, and governance. Enforcing access rights to avoid over-exploitation given the open access nature of forests, for example, will be as important as developing markets for forest products.

Another issue to consider is access to and pricing of extracted wood. As noted above, substantial quantities of firewood are provided with subsidies. Firewood is regulated by Forest and Nature Conservation Rules of Bhutan 2006. The Rule specifies that households are allowed 16 m³ of fuelwood per year if they lack electricity or 8 m³/year if they have electricity, irrespective of household size, need, forest type, availability. Households also have entitlements to certain amount of timber for construction. The free provision of wood to individuals arguably holds back the development of more specialized and efficient sources of building materials.

At the same time there is strong need for more accurate economic valuation of the services provided by forests (such as water regulation, soil retention) to improve decision making. For instance, market prices do not accurately reflect the value of ecosystem services because of their public good characteristic: they are often one or both of the “non-excludable and non-rival” pair. Market prices are often missing for many services because these services are invisible. Improving the understanding of the economic value of ecosystem services, particularly non-provisioning services, and making these values explicit in measures of economic growth can inform policies to increase the economic contribution of forests to economic growth sustainably.

Countries rich in forest resources are relying on a number of policies and tools to achieve inclusive green growth in this sector, including,

- To support sustainable forest management, a number of countries are strengthening their capacity to collect, compile, and analyze forest-related data, including forest inventories, forest cover maps, and forest accounts. Forest accounts (see Box: Forest Accounts: Why should countries compile these?) in particular allow policymakers to understand the current contribution that forests are making to the economy, accounting for the full range of goods and services generated by forests, and how this contribution can be increased sustainably.
- Countries are also strengthening capacity for management, developing working plans, and for governance by strengthening the role of local communities to ensure that access to forest resources is regulated.
- Finally, countries are increasing sustainable value added from a range of goods and services from the sector, not only timber, by supporting value chains for important NWFPs, designing and implementing payment for ecosystem services schemes to monetize what are otherwise non-marketed regulating services and providing an incentive for their provision, etc. Moving up the value chain, shifting from extraction alone to downstream processing, can help provide additional, more productive jobs, though such “industrial” policies may not always be in the country’s comparative advantage and would need to be justified on a case by case basis.

Box 3: Forest Accounts: Why should countries compile these?

Forests are an important natural asset for a number of countries, and provide a range of critical goods and services that are important to the economy. Goods and services range from provisioning services such as timber, firewood, and a variety of non-timber forest products, to cultural services such as recreation and tourism, to regulating services such as water regulation, soil protection, biodiversity protection, and carbon storage. These goods and services benefit the economy directly but also by supporting other economic sectors such as hydropower (through water regulating and soil retention services), and tourism (by supporting eco-tourism).

Yet, policymakers do not have the information they need to manage this important economic asset. This includes information not only about the extent of forest resources and how it is changing, but equally importantly information about the economic contribution of forests and impacts of non-forestry policies on forest resources and services.

Countries rely on the System of National Accounts (SNA) to provide detailed information about the economy to help policymakers assess economic performance, support policy analysis, and inform decision-making. The SNA, however, has a number of shortcomings when it comes to the environment in general and forest in particular, limiting its usefulness as a source of information for forest management. For one, the SNA treats cultivated and natural forests differently. For cultivated forests it records production and changes in the stock while for natural forests it only records production. The value of forest degradation and depletion is not recorded as a cost against the income earned by enterprises (be it state or private) extracting forest resources. More importantly, a number of non-market goods and services provided by both cultivated and natural forests are often not included in national accounts. Or many non-market services are wrongly attributed to other sectors of the economy.

Because existing state accounts do not fully capture the economic contribution of forests, total benefits from sustainable forestry are underestimated and other sectors are not fully aware of their dependence on healthy forests. These factors are likely to bias decisions away from sustainable management of forests and prevent policymakers from fully leveraging forest resources to realize their contribution to economic growth.

Forest Accounting, that is compilation of detailed statistics (using a framework like the System of National Accounts) to help monitor the interactions between the state of forest resources and the state of the economy, can help fill this information gap. Applications of these accounts can help inform policies on how the economic contribution of forests to the state economy can be maximized. Forest accounts linked with tourism accounts, for example, can help inform government policy on nature-based tourism, and ecosystem accounts for watersheds can help design payment for ecosystem services schemes.

Source: World Bank Staff

To summarize, given the extent of forests in Bhutan, it is important to understand how this natural asset can contribute to the country's economic growth without compromising Bhutan's commitment to maintaining 60% of its land permanently under forest cover. Forest accounts can help make clear the contribution that forests make to the economy, including the contribution to the hydropower power sector through the provision of ecosystem services such as water regulation and soil retention, the contribution to the tourism sector, and to rural livelihoods. Building on data provided by forest accounts, but based on in-depth assessment of institutions, policies, regulations, etc., targeted analytical studies can help assess how the contribution of the forestry sector to the economy can be increased in a sustainable manner. This should include an analysis of issues such as (i) the economics of wood charcoal: Should a

country as rich in forest cover as Bhutan import wood charcoal? What trade-offs are inherent in such a policy? Can this policy be justified on economic grounds within the current policy framework? (ii) the potential impacts of the current timber allocation policy on development of a furniture industry in Bhutan: Under the prevailing forest management practices, households in rural areas are allocated a certain amount of timber for house construction at subsidized rates. Does this allocation system lead to market fragmentation and through it to a lack of development of the furniture industry in the country?

Box 4: Forest accounts Guatemala

Guatemala is a small, culturally-rich Central American country that houses a tremendous quantity of biodiversity and abundant forest resources. Like many resource-rich developing countries, Guatemala is faced with the challenge of managing its resources in a sustainable manner. A crucial step in managing resources and designing effective policies has been to accurately measure assets particularly forests.

Prior to the compilation of the forest accounts, the National Forest Policy of Guatemala incentivized the development of a plantation silviculture industry and attempted to protect strategic forest ecosystems. As a result of the development of forest accounts, researchers have been able to model the impacts of the national incentive program, PINFOR, and have concluded that large-scale timber industries does not provide the most value-added to the Guatemalan economy. As such, the accounts have informed the policy dialogue of how to continue PINFOR in a sustainable way after it is scheduled to end in 2016.

In addition, data from the accounts allowed researchers to conduct a study on fuel wood consumption. As a result of the study, a strategy for the production and efficient use of fuel wood is currently being developed. Although this strategy is in the initial phases, the accounts have informed the debate and are being used to develop initial drafts of the strategy. The development of strategies to efficiently use fuel wood and stop illegal logging will help Guatemala manage forest resources to contribute to the economic growth of the country while maintaining forest productivity and other environmental and community services that forests provide.

Source: World Bank Staff

Agriculture

Agriculture is an important economic sector in Bhutan, particularly as a source of livelihood for the rural poor. Even though only 2.9% of the land area in Bhutan is classified as agricultural (SYB 2013), the share of the sector in GDP stood at 6.4% in 2012 and it provided employment to over 60% of the total population (NLFS, 2011). Paddy, maize, apple, oranges, and potatoes are the major crops and cattle and poultry the major livestock. Moreover, agricultural commodities --- cardamom, potatoes, orange, apple and wheat/barley --- accounted for 4.3% of exports (RNR Sector 11th Plan) in 2011. Given the limited availability of land for cultivation but also predominance of subsistence farming, 60% of cereal, vegetables and animal products and 95% of fruits and nuts are domestically produced while 97% of fish, 80% of beef, 77% of pork, and 90% of oils and fats demands are met from imports (Labor Force Survey, 2012). Meeting a greater share of the demand through local production, increasing self-sufficiency in food production, is an important goal for the country under the 11th FYP.

The sector grew from 2009 to 2012, though slowly, and faces a number of challenges. Studies indicate that yield per hectare has been on the decline at a compound annual rate of 1.84% over the last 27 years (11th Five Year Plan). Inadequate farmer labor is considered a constraint because of out-migration in rural areas. This is compounded by inadequate access to markets due to limited number of farm road linkages. Lack of irrigation is another constraint: agriculture is still dominated by rain-fed dryland farming. With 31% of the agricultural land located on slopes more than 50°, soil erosion rate is high and estimated to be approximately 3.5 t/acres (DOA, 2011). Moreover, there are various pest and diseases and it is estimated that annually crop loss to wild animal invasion accounts from 0.3 to 18% of total household income (RNR Sector 11th Plan).

The RGoB is developing strategies to meet a number of these challenges, especially through the 11th Five Year Plan. Bhutan aims to shift from subsistence to commercial farming, and develop agri-business enterprises to increase rural livelihoods and facilitate economic growth. Mechanization will be promoted to help address labor shortages, and large scale irrigation schemes will be developed and watershed management plans implemented to make water resource available. A comprehensive strategy to address human-wildlife conflict is also being developed and the country hopes to work towards ensuring sustainability when improving productivity, through soil and water conservation, natural resources restoration and appropriate farming systems.

These policies will support inclusive green growth in the sector, that is, help to increase productivity across land holdings of different sizes while addressing concerns of land degradation. Global experience on inclusive green growth in this sector though shows frequent tradeoffs between increases in productivity and greener outcomes (be it cleaner air, cleaner water, less solid waste, and more biodiversity), and often between increases in productivity and more equitable growth (with larger farms or production facilities sometimes seen as necessary for productivity increases). However, these tradeoffs are often not inevitable and can also be minimized: innovation, which can in part be supported through smart subsidies, can for example help to overcome these tradeoffs. A good understanding of the tradeoffs at play is essential.

Some examples of green growth strategies in the agricultural sector are as follows:

- Watershed management programs have been implemented in a number of countries in rainfed areas to increase agricultural productivity by controlling soil erosion, preventing siltation of water bodies, and improving the reliability of water resources. In effect, therefore, increasing agricultural productivity while promoting greener outcomes. Experience from these programs shows the need for increasing efficiency in targeting investments and overcoming challenges such as weak delivery systems and capacities and inadequate monitoring systems. These challenges require strengthening institutions and human resources for more effective planning, implementation, monitoring and evaluation, and reporting of watershed management programs. The challenges also require the application of innovative, science-based knowledge, tools, and approaches to underpin improvements around watershed planning and implementation, agricultural intensification, rural livelihoods, and hydrology.
- Promoting sustainable intensification of agriculture through increased use of fertilizers and pesticides and management of potential environmental impacts through regulations, have similarly allowed countries to increase productivity while managing tradeoffs with environmental outcomes. Intensification (with complementary policies to prevent extensification) can protect biodiversity, reduce deforestation, save water and reduce GHG emissions through “producing more with less”. Rice yields world over increased from 1.8 tons per ha to nearly 4.5 tons per ha from 1960 to 2010 for example, while the area planted with rice increased from 125 million ha to 150 million ha. To attain the same production increase with no growth in yields, the area planted with rice would have needed to increase to 300 million ha. However, intensification also contributes to both water and air pollution, including from runoff from excess nitrates and agrochemicals leading to the pollution of water bodies and soils. These impacts need to be managed.
- Technological innovation plays a key role in green growth strategies for agriculture including development of varieties which include many improved characteristics, are drought resistant, require less fertilizer and are resistant to common pests and diseases, reducing requirements for pesticides. Technological innovation also allows for increasing productivity in the livestock sector, without trading-off equity or environmental outcomes (see Box on Kegg Farms – A Better Backyard Chicken in India: innovation is key to green growth outcomes).
- Implementing payment for ecosystem services schemes to provide households the incentive to switch from crops to trees on sloping lands as was done in China under its Sloping Land Conversion Program (see Box on China’s Sloping Land Conversion Program) can help to reduce soil erosion. PES may not always achieve additionality, that is, result in environmental outcomes that would not otherwise have been achieved without the scheme, and this will require careful design. Schemes that provide payments to all landowners that are providing environmental services irrespective of whether these are additional are likely to have greater poverty reduction impacts and lower environmental outcomes, for example.

- Conservation agriculture⁶ is another example of a green growth strategy applied to agricultural production. This agricultural practice simultaneously (i) yields environmental benefits (decreased nutrients pollution of waterways, increased carbon sequestration in soils), (ii) increases the efficiency of production (through a lower use of energy inputs) as well as its byproducts (such as biogas), (iii) increases resilience (through frequent rotations between crops), and (iv) increases agricultural productivity in the long run (through decreased erosion and enhanced soil structure). Hence, agricultural productivity and environmental quality appear to have a high degree of complementarity in conservation agriculture.⁷

Box 5: Kegg Farms – A Better Backyard Chicken in India: innovation is key to green growth outcomes

Kegg Farms in India have bred a robust and improved dual purpose backyard chicken, called a Kuroiler, which lays 100 – 150 eggs per year (as opposed to around 40 for a Desi Chicken) and grows to 2 1/2 kilos in about half the time for a Desi chicken to reach one kilo. The company produces around 16 million day-old chicks. These are sold to 1,500 mother units who grow on the chicks for about two weeks before inoculating them and selling them to approximately 6,500 bicycle salesmen (pheriwallas) who on sell them to individual villagers mainly to women. Sales are made to some 800,000 farmers, often located in some of the remotest part of the country. The turnover in sales of chicks is some \$5 million a year with another \$5 million turnover for the thousands of small rurally based businesses that grow on and sell the chicks.⁸

Independent assessment indicates that the average output generated per Kuroiler chick is \$3.1 both as eggs and as meat, of which the cash generated amounts to about \$2/chick. At some 16 million chicks distributed this would be an aggregate output of about \$50 million, some \$30 million cash generated and a cash profit of about \$10 million. Profits are significantly higher than raising desi bird. The Kuroiler birds bring more market orientation, contribute to significantly household cash flow, and as the enterprise has become more commercial, women have maintained control over the enterprises. Additionally, Kegg chickens typically obtain a premium over the typical broiler chickens as the meat is darker and more flavorsome (i.e. about Rs 60/kg). Kegg farms birds are spurring the development of a second small-scale poultry based business. About 25% of the birds are being sold to Peri-Urban farms concentrating on meat production. This proportion of the market is likely to increase.

The success of the system is built on the package of the superior performing birds – which are both robust and better able to scavenge food and have improved food conversion ratios coupled with the company’s business mode, with its devolved, rural based distribution system with in-built incentives.

Source: D. Isenberg. “Kegg farms: which came first? The Kegg or the Broiler?” Harvard Business Review Harvard Business Review 2006, and updated from World Poultry news 2008

Box 6: Conservation Agriculture

Southern Province, Zambia: Conservation Agriculture (CA) approaches foster natural ecological processes to increase agricultural yields and sustainability. In Zambia, these involves six basic conservation farming technologies: retaining crop residues, concentrating tillage and fertilizer application in a permanent grid of planting basins or series of planting rows, completing land preparation in the dry season, weeding aggressively to reduce plant competition, and inter-cropping or rotating nitrogen fixing legumes on up to 30% of the cultivated area. Many farmers also incorporate nitrogen-fixing trees that also provide fodder and fuelwood. The area restored to date is 300,000 ha with over 160,000 participating households. Yields on farms using CA practices doubled in maize plots and were 60% higher for cotton, as compared to conventional plowing systems. An FAO (2010) budget analysis in Zambia found that returns under CA are significantly higher than under conventional systems: US\$104/ha under CA and US\$19/ha under conventional tillage.

Brazil has also adopted the approach, with technologies adapted to different regions. One approach supports a mixed livestock and crop system, rotating pastures with crops. The zero tillage system supplies residual nutrients for cheap pasture and the pasture phase reduces pests, weeds and diseases. . The most common rotations are a combination of soybeans, cotton and maize followed by one to three years of pasture. These practices have enabled higher pasture stocking rates and reduction of soil degradation and water runoff

Source: Scherr *et al.*, (2011).

Box 7: China's Sloping Lands Conversion Program

In China, 2-4 billion tons of silt is estimated to go to Yangtze and middle and upper reaches of the Yellow River every year and 65% of this was estimated to come from sloping croplands. China's Sloping Land Conversion Program (SLCP) was developed to deal with this challenge. Its environmental goal is to reduce water and soil erosion as well as increase forest cover through retiring steeply sloping and marginal lands in agriculture production. The program also aims for poverty alleviation and helping farmers to transfer to sustainable production. The program was budget of RMB 337 billion (over US\$40 billion). It set a target of converting 14.67 million hectares of cropland to forests by 2010, among which, 4.4 million are steep land with more than 25 degrees of slope. Afforesting an equal area of wastelands was an additional "soft" goal. The program was expected to increase forest area by 10-20% helping to increase domestic timber supply.

The basic approach of the program was to provide compensation to farmers who transferred degraded and highly sloping cropland to timber-producing forests, which are considered as "ecological forests", or plantations including trees with medical value, or orchards, which are considered as economic forests. The subsidies took three forms, annual in-kind subsidy of grain, subsidy in cash and providing farmers free seedlings. The subsidies varied based on different regions. The grain subsidy was between 2250 kg/ha – 1500 kg/ha and the cash subsidy RMB 300/ha/yr (USD 36/ha/yr). Both were provided for 8 years based on meeting the requirement of planting forests for 5 years or grass for 2 years. Furthermore, income from forests and grasslands was to be exempt from tax.

The SLCP has helped increase carbon sequestration, ecosystem services and timber supply. More than 7.2 million hectares of cropland had been retired by the end of 2003 under spending of RMB 50 billion.

Source: Michael, T.B. and Xu, J. "China's Sloping Land Conversion Program: Institutional Innovation or Business as Usual?", Workshop on "Payments for Environmental Services (PES) – Methods and Design in Developing and Developed Countries."

To summarize, to support Bhutan's goal of increasing food security and to also help increase rural livelihoods, it will be important to reverse the trend of declining agricultural productivity. For this, in turn, a first step would be to support targeted analytical studies to understand how the productivity of the agricultural sector can be increased while promoting shared prosperity and green outcomes. This will include understanding the role of farm consolidation and contract farming as well as commodity exchange markets, but also better understanding the potential trade-offs between higher productivity and more equitable and greener outcomes and how these tradeoffs can best be managed. Given the topography, impact on land quality (erosion, pollution, etc.) of a transition from subsistence to commercial agriculture would be important to understand.

Mining and Manufacturing

Bhutan has large deposits of a number of industrial minerals and is a prospective source for base and possibly precious metals. The main types of mineral currently being developed in the country include dolomite, limestone, gypsum, coal, quartzite, and marble. In 2012, though the mining and quarrying sector in Bhutan contributed only 1.9% of GDP, it was the second largest foreign exchange earner, second only to energy, and the sector thus plays an important role in the balance of payments. Dolomite, gypsum, coal, cement, copper wire, ferrosilicon, and manganese are the main exports (The Mineral Industries of Bhutan and Nepal, 2013).

In the 11th Five Year Plan, the mining sector has been highlighted as a key sector to support economic development and enhanced exports. Only about 39% of the country has been geologically mapped and further discovery of mineral deposits is expected in the rest of the country. Currently most activity is in the western part of the country, where infrastructure also is concentrated.

Bhutan's mining sector faces a number of challenges of management, allocation, and monitoring, in part due to the absence of a clear mineral development policy.⁹ The sector is also constrained by lack of human resource capacity in the public and private sector. Moreover, although Bhutan has been cautious of the environmental consequences of mining, limiting the land area accessible to the sector, in 2013 about 42% of the commercial extraction operations were found not to comply with environmental requirements. The concern especially is with the impacts on communities near the mining sites.

Bhutan aims to promote environmentally and socially responsible mineral development by increasing number of mines revegetated, promoting value addition of minerals¹⁰ to limit the area mined and support quality mines, and ensuring that mineral royalties benefit local communities through sub-national mineral revenue allocation mechanisms such as the proposed community development fund. Technical and human capacity of the government and private sector also is to be strengthened. A potentially useful complement to these measures could be fines for pollution damages caused by lack of diligence in following environmentally sound mining practices, and for failure to adequately restore sites.

Improving the environmental performance of the sector will make growth greener, and the proposed allocation of royalties towards a community development fund will also make growth in the sector more inclusive. But because minerals are an *exhaustible* natural resource, promoting inclusive green growth also involves how the economic rents from mineral extraction are managed. To ensure that the potential of these natural assets to contribute to growth in the future is not lost, (given that national income is a return on national assets), it is critical that a share of resource rents from mineral extraction are reinvested in other assets that can continue to produce an economic return long after the mineral resources have been exhausted. Such

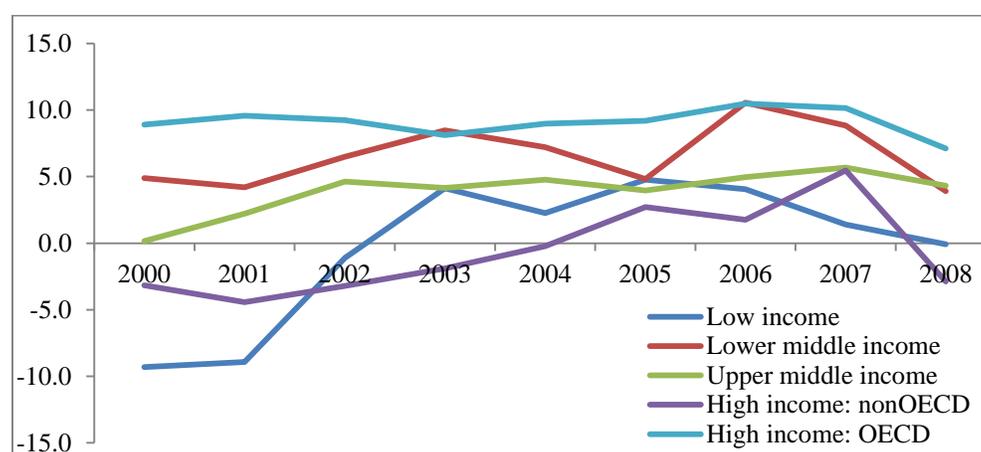
⁹ The Mineral Development Policy has been drafted and is expected to be approved within the first year of the Eleventh Plan.

¹⁰ Due to the abundance of hydro power and cheap energy, Bhutan has an advantage in energy intensive mineral beneficiation industries. However, this benefit may be eroded over time if the value added from use of electricity in domestic beneficiation is less than what it could obtain from power sales to India.

reinvestment can include “soft” assets such as additional financing for enhancing worker skills in other sectors, and for improvement of institutional capacities to promote manufacturing expansion in other sectors (e.g., food and forest products processing).

The World Bank’s comprehensive wealth accounts (World Bank, 2006 and 2011), and in particular its Adjusted Net Savings (ANS) indicator, provide an assessment of whether countries rich in sub-soil assets are using this natural capital to support sustainable development through rent capture and reinvestment. Because national accounts measure gross savings and depreciation of produced capital, but do not record changes in the stocks of human and natural capital, the World Bank developed the ANS as a more complete measure of savings. ANS measures the change in a country’s national wealth: a negative ANS suggests that the country is running down its capital stocks and a positive ANS that the country is adding to its wealth (see Box on Calculating Adjusted Net Savings). As shown in the figure below, ANS for low-income resource-rich countries was negative for a number of years and relatively low even when positive, suggesting that these countries are failing to leverage their natural assets for broader development gains and may be running down their total wealth. Surprisingly, so too are the high-income non-OECD countries.

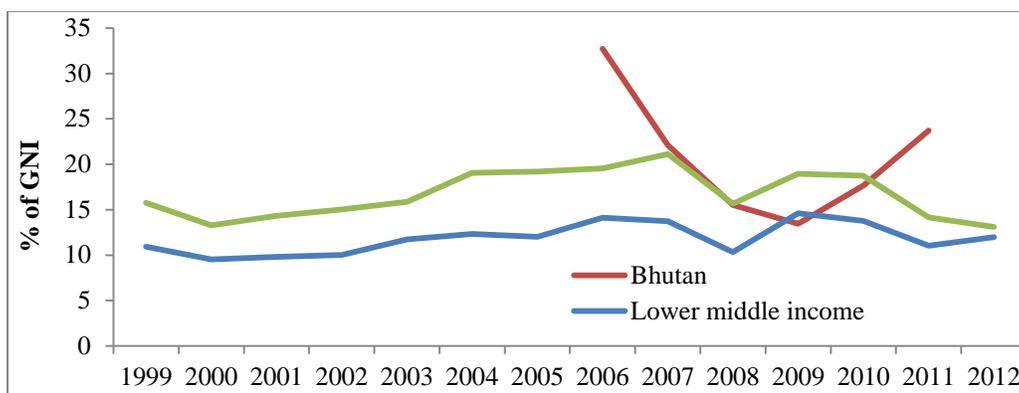
Figure 4: Adjusted Net Savings: Resource-rich Countries by Income Group



Source: World Bank, (2011)

The lack of readily available data on national gross savings for Bhutan has limited the construction of a time series on ANS for Bhutan. Data available for 2006 to 2011 though shows that ANS is positive for this period and Bhutan is on a sustainable path. These data, however, do not provide an indication of the extent of rent recovery – how much of the resource rent generated by the sector is recovered by the state and available for public finance. Construction of mineral accounts as part of the System of Environmental and Economic Accounts would provide Bhutan better indicators and detail statistics to manage this sector, and help to inform a broader policy on public revenue management.

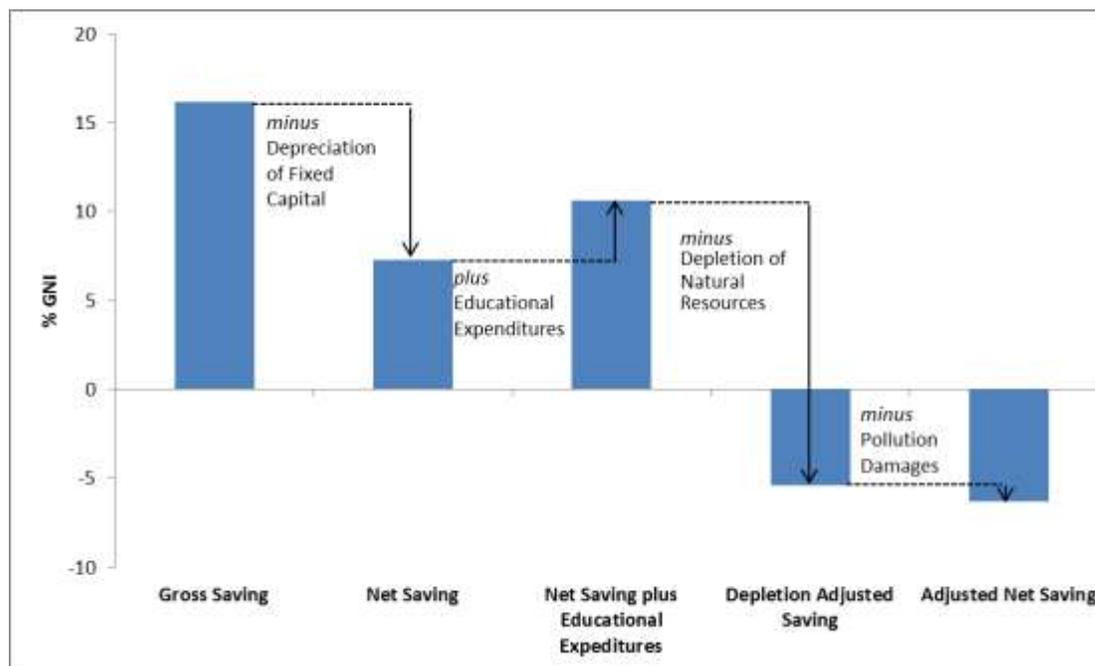
Figure 5: Adjusted Net Savings: Bhutan and Other Lower Middle Income Countries



Source: World Bank, (2014). World Development Indicators

Box 8: Calculating Adjusted Net Savings

Figure 6: Calculating Adjusted Net Savings



Savings lay the basis for building wealth and future growth. Adjusted Net Saving (ANS) measures the real difference between production and consumption, taking into account depreciation of fixed capital, investments in human capital, depletion of natural resources, and damages caused by pollution.

Adjusted Net Saving is derived from the standard national accounting measure of Gross Saving by

making four adjustments, illustrated in the figure above:

1. Consumption of Fixed Capital is deducted from Gross Saving to obtain Net National Saving;
2. Educational Expenditures is added to account for investment in human capital;
3. Estimates of the Depletion of Natural Resources (which include forests, energy, and minerals) are deducted to reflect the decline in asset values associated with extraction and depletion; and
4. Deductions are made for damages from carbon dioxide and particulate emissions, to arrive at Adjusted Net Saving.

We turn next to the manufacturing sector, which remains relatively underdeveloped in Bhutan. This sector contributed about 10% of GDP for the past five years. Among the 2,240 manufacturing establishments, 14.5% are agro-based, 42.6% are forest-based, 10.5% are mineral based and others accounts for 32.4%.

While Bhutan aims to achieve economic growth in part by developing its manufacturing, this sector faces various challenges. According to 11th FYP, manufacturing in Bhutan is constrained by inadequate access to capital, finance, labor and skilled human resources. Manufacturing also faces a small domestic market, high transportation costs, difficult terrain, low productivity, and little or no technological advancement. These constraints have led to low volume, high cost in production and poor quality of products.

Bhutan plans to focus on three programs in the manufacturing sector during the 11th FYP to overcome some of these challenges. The first is to promote sustainable and environmentally friendly development by establishing, enhancing and managing industrial parks and special economic zones and by strengthening infrastructure in industrial estates. The second program is to strengthen the policy environment and institutional capacity for manufacturing growth through improving public service delivery, accelerating FDI promotional activities, and establishing promotional strategies for priority sectors. The third program is to enhance development of cottage and small industries (CSIs) and employment by CSIs through promoting access to finance and market, promoting competitiveness and innovation, enhancing human capital and developing a culture of entrepreneurship.

Bhutan has ambitious plans for developing new sectors and product lines to capitalize on its natural resources and its reputation as a “clean and green” environment. The Economic Development Policy has, for example, identified areas of economic growth in the manufacturing sector, including agro and forest based production (including biotechnology like pharmaceutical, nutraceuticals, traditional and herbal medicines, etc.); and further development of products derived from other natural resources (select mineral-based products and water-based products). The Economic Development Policy calls for government incentives to promote green technology. (More generally, the Policy advocates for other sectors such as high quality green services (tourism, R&D consultancy services, high-end health services and traditional medicines); and information and cultural industry (handicrafts and textiles, etc.).)

While promoting green manufacturing could be a part of Bhutan’s green growth strategy, there is a need to further study where comparative advantages for significant growth potential among these options might lie. Green growth also requires that health risks from manufacturing-

based pollution be managed cost effectively. The main environmental problems in this sector are air and water pollution, hazardous waste generation, and land degradation. Little data are available on these problems, however, particularly industrial solid waste and industrial effluent discharge.

Tourism

Tourism is an important sector in Bhutan, and has the potential for further growth. The industry began in 1974 and was privatized in 1991. Since tourism is not a sector in national income accounts, it is hard to assess its full contribution to GDP. There were 105,407 tourists in 2012 including international (57% of arrivals) and regional business visitors, 65% higher than 2011 (SYB, 2013). Culture and nature have been the two main attractions for tourists (SYB, 2013), making this an important sector for green growth. About 22,045 employment opportunities were created in 2011 through this sector (11th FYP). The sector is considered an important source of foreign exchange earnings. Gross earnings from international leisure tourism were 63 million USD in 2012, 32% more than 2011 (SYB, 2013).

The tourism sector is governed by the policy of “high value-low impact”, which raises environmental awareness. High value is adopted by implementing high tariff and strict operational regulations. \$200/day each person is required (Scheyvens, 1999). Tourists must come on a package tour with access permitted only to some areas.

The 11th FYP lists the challenges faced by the tourism sector which include accessibility, seasonality, and product diversification. The capacity of air transport services puts constraints on visitors, and there is also a shortage of trained guides and skilled workers in the hospitality sector. Product development and destination marketing are also required.

During the 11th FYP, Bhutan plans to increase tourist arrivals to more than 200,000,¹¹ the sector’s contribution to GDP by almost four times, and employment to 40,000. Bhutan aims to improve product diversification so that regional and seasonal variations are smoothed out and standards of services are improved. New product development is planned in categories including wellness, cultural tourism, sports, adventure, ecotourism, and “MICE” (meeting, incentive, convention and event). Based on concerns that large portions of the benefits of ecotourism are being received by the government and urban elites (Bhutan’s Success in Conservation 2011), efforts are to be made to ensure that local communities also benefit from tourism.

Tourism sector in Bhutan is inherently green as nature and Bhutan’s green image is a major draw for tourists. As Bhutan though pushes for further growth in this sector, it is important that its policies be informed by better evidence. For this, in turn, there is an urgent need to improve tourism-related statistics.

¹¹ It is worth noting that the tourism strategy ought to focus on tourism *revenue* and not tourist numbers. If demand for tourism is inelastic, (i.e. high-end niche tourists) then increased tourist numbers will necessitate a reduction in price and revenue. Global experience suggests that niche tourism is considerably more profitable than highly competitive high-volume – low cost variety.

Box 9: Nature-based Tourism at Addo Elephant National Park in Eastern Cape Province of South Africa

The Addo Elephant National Park (AENP) is a protected area with enormous amount of biodiversity in Eastern Cape Province in South Africa. The province is least developed with 51% households under poverty and 25% unemployed. Pastoralism is important to local communities but began to threat biodiversity through desertification. The AENP also faced the challenge of an increasing elephant population. The Global Environment Facility funded AENP to develop an integrated conservation and development project (ICDP) in order to expand the boundaries of AENP and facilitate sustainable development through direct employment in nature conservation and nature-based tourism for local communities.

The project succeeded in achieving park expansion, generating local economic benefits and conserving nature. The strategy of the project was to provide training to local communities to facilitate tourism employment opportunities, granting contracts to small, medium, and micro-enterprises for infrastructure expansion, promoting marketing of the park and attracting private investors to initiate nature-based tourism ventures. The project also relied on the implementation agency, South African National Park, to channel private investment, monitor ecological impact and infrastructure investments and mediate stakeholders to generate census. 514 training days per year and 32 internships were provided related for tourism guidance, conservation guardianship, and hospitality reception. 540 more people were employed inside AENP while outside employment reaches 1842 people. The local employment included activities such as road construction, alien vegetation removal, support for accommodations, etc. The employment opportunities bring direct economic benefits to local communities. Furthermore, the nature-based tourism drives land and labor away from consumptive land uses to tourism activities.

Source: U. Narain & A. Orfei, (2012). Biodiversity, Nature-Based Tourism, and Jobs.

Urbanization, Transportation and Environmental Challenges

Bhutan has been experiencing rapid urbanization. As noted, the 2005 population census figures indicated that urban population stood at 31% of total population, a rapid increase from only 5% in 1995. The trend has continued: the urban population in Bhutan has been growing at 6.7% annually. The capital, Thimphu, is also the largest city with 15% of total population in 2005. Phuentsholing and Paro are other significant urban areas.

Rapid urbanization, if not well managed, can lead to a number of environmental concerns. Rapid urbanization is accompanied by increased waste volumes from households, commercial and industrial enterprises, and construction, which increase pressures on landfills. Cities such as Thimphu also face growing challenges to meet increasing demands for safe water supply and for environmentally sound wastewater management. In addition, urbanization creates air pollution issues due to spatially concentrated use of polluting transport and household fuels, as well as dust from construction and road work. Finally, forestlands near population centers can become degraded, due to the increased demand for firewood and construction timber. The general absence of flat land near population centers can similarly result in settlement on steeper slopes, thus potentially leading to higher risk of erosion, disruption of waterways, and possible floods and landslides.

From 2003 to 2005, solid waste generation increased at the rate over 33% in Thimphu. Such a rapid increase has caused waste to exceed the capacity of the existing landfill. There is no waste segregation, and all types of waste go to landfills. Other than municipal wastes, healthcare, industrial and electronic wastes also are of concern. Although there is some form of solid waste management in 12 urban centers (see Box on Greener Way – waste management and recycling company in Bhutan), waste management is not adequate.

Regarding water pollution, domestic sewage is the main source. Only 20-30% of households in Thimphu are connected to a sewer system, though this number increases to 60% in the city of Phuentsholing. Domestic sullage and seepage from septic tanks and pipes flow into water lead to water contamination, which in turn causes diseases such as diarrhea and dysentery.

Vehicle-based air pollution is caused by poor fuel quality, inefficient combustion of fuel, and increased traffic around Thimphu Valley. In 2000, road transport also accounted for about 19% of the total national CO₂ emissions (Bhutan Environment Outlook 2008). Road construction and repair, coarse particles from re-suspension of road dust, wind-blown dust from road construction during winter dry season (especially Mar-Apr) and smoke from roadside wood-fired heating of bitumen for road paving all contribute to transport related air pollution (Strategy for Air Quality Assessment and Management in Bhutan, 2010).

Industrial emissions have been identified as another source of air pollution. The industries that contribute the most to air pollution are cement production, chemical processing, and mining (Bhutan Environment Outlook 2008). Emissions are not well dispersed due to the low height of the emission stacks and thus polluting the surrounding valley (Country Synthesis Report on Urban Air Quality Management, Bhutan, 2006). One other environmental challenge is associated with construction – stones and other materials used for construction are often

dumped down forested slopes and these go into the river and sometimes cause damage to hydropower facilities located downstream. (Dam building spoils Bhutan's green image, 2013).

Bhutan has taken a number of steps to address pollution problems in urban areas, as well as industrial pollution. To respond to water pollution related issues, Bhutan has been increasing access to better water sources and aims to improve connection to the sewerage system. Regulations have been put in place for the procurement and use of chemical pesticides since 2000. Standards have also been set to regulate industrial discharges to water (Bhutan Environment Outlook, 2008). Key for avoidance of risk to human health (especially for children), however, is availability of clean drinking water – whether piped or otherwise distributed. National drinking water standards need to be formulated, modeled on the WHO drinking water quality standard. In addition, improved enforcement of regulations through use of innovative instruments and strengthening capacity of regulating agencies also will be important.

Green growth policies also need to emphasize conservation of water, especially treated water. The absence of realistic pricing policies encourages high water use and waste. Demand based pricing policies would promote conservation of water.

Various measures have been promoted for reducing waste generation and increasing recycling, e.g. efforts to separate out organic materials for composting. There is also room for consideration of economic instruments in this context. Refundable deposits for larger and potentially hazardous products like vehicle batteries have worked well in other areas. Buyback programs for refrigerants are another option. Reduction of trash generation might be fostered by charging for plastic bags and providing convenient collection centers for higher-value recyclable materials, notably aluminum. Municipal finance management is another important issue. Extremely low property taxes and limited autonomous right of local government have limited revenue capture by cities. Policy reform on municipal finance management is essential for sustainable green growth.

The 11th FYP aims to revise Ambient Air Quality Standards and promote access to public transportation both through mass public transport (such as bus rapid transit - BRT) and ropeway and waterways. Households in Bhutan are also increasingly using cleaner sources of energy instead of fuel wood (Bhutan Environment Outlook, 2008). This can be taken further: public education and increased enforcement can be used to enforce bans on open burning (especially of trash), avoid use of fuel wood for heating road surface treatments, and improve environmental performance of industry through instruments such as public information disclosure schemes. Progress on vehicular pollution can be made with more vigorous inspection and maintenance programs, including the possibility of bans on the oldest and highest-emitting vehicles, as well as a switch to low-emitting vehicles, especially for public transit.¹²

As noted, management of greenhouse gas emissions is another government priority, with the aim to be carbon-neutral. Figures from Bhutan's Second National Communication to the UN Framework Convention on Climate Change indicate that Bhutan's emissions of CO₂ from energy use in 2000 were 260-315 thousand tons – very small numbers in the global context. Figures for

¹² Vehicle ownership also can be taxed based on emissions performance, with the funds used to promote improved inspection and enforcement measures. A green tax on motor vehicles started from 2012-13. In that FY, Nu 35,937 million were collected, which amounts to 0.2% of the total internal revenue.

2010 from the US Energy Information Administration are larger, at about 480 thousand tons, reflecting an increase in energy use over the decade. Beyond energy-related emissions, Bhutan also has emissions related to industrial processes, agricultural activities, and waste decomposition. The Second National Communication reports the total of these at about 1.3 million tons – mainly from agriculture. Against this, sequestration of emissions from Bhutan’s forests is estimated to be slightly over 6.3 million tons. On balance, then, Bhutan’s net GHG emissions in 2000 are significantly negative. There is no reason to think that this is no longer true more recently, given Bhutan’s forest management and the ability of those forests to continue to sequester carbon.

One could then conclude that Bhutan already is well beyond achieving carbon neutrality. The policy issue is the extent to which one wants to include forest carbon sequestration, versus wanting to move closer to carbon-neutrality with respect to net sources, like energy use. This sort of approach necessarily would be costly if pursued on a large scale, diverting resources away from other growth-enhancing activities while giving too little credit to a key ecosystem service being provided by the forests.

Box 10: Greener Way – waste management and recycling company in Bhutan.

Greener Way, established in 2010, is the first waste management and recycling company in Bhutan. The company aims to work towards clean and environmentally rich Bhutan and also address climate change issues. The company has developed an integrated solid waste management system that is environmentally sound, technically feasible, cost effective and public acceptable. Greener Way recycle traditional items including newspaper, magazines, brochures, metal food & beverage cans, and glass bottles & plastic containers as well as yard wastes including electronics, tires, and they hold annual household hazardous waste event. The wastes are collected at a fixed rate. For example, Nu.18/kg per bottles, Nu.6/kg paper wastes, etc. Then, recyclables collected are sent to a recycling plant in Malda, India, where Greener Way generates income and recyclables are processed. As of October 2013, Greener Way has employed 31 people, generates income for over 150 “raga pickers, and reaches annual turnover of \$140,000.

Greener Way is committed to saving the environment. Being left untreated in the landfill, wastes may generate methane gases and lead to pollution. Greener Way’s reuse and recycling programs help reduce landfills and incineration and thus conserve environment. 11 months after establishment of Greener Way, 230 tons of recyclable wastes were collected. Before Greener Way, wastes from Thimphu all go to the Memelakha land fill site. As of March in 2012, wastes at Memelakha has been reduced 20% by volume, particularly the items recycled by Greener Ways, including pet bottles, carton boxes, broken glasses, and rubber. The company also dedicates to educational outreach program, such as educating Bhutan on waste management through classroom presentations, environmental workshops, public displays and funding for nationally recognized recycling programs.

Source: Greener Way company website. <http://www.greenerwaybhutan.com/>

“Bhutan goes down Yonten’s Greener Way”. <http://www.recyclingwasteworld.co.uk/features/bhutan-goes-down-yontens-greener-way>

“Finding a greener way for recycling waste”. <http://www.yanatravel.com/2011/news/finding-a-greener-way-for-recycling-waste.html>

Subba, S. (2012). “Greener Way to construct transfer station in govt. allotted land”.

<http://www.thebhutanese.bt/greener-way-to-construct-transfer-station-in-govt-allotted-land/>

Conclusions

As noted at the beginning, this Note is not intended to lay out a particular road map for furthering green growth in Bhutan. Instead, the purpose is to support the Government of Bhutan in the design, implementation, and monitoring of green growth policies in identified priority areas, to further the discussions on these issues.

We noted some key growth related challenges facing Bhutan, a number of which are not necessarily related to green growth. These included macroeconomic imbalances created by hydropower led development; stagnation in agricultural productivity growth; rising youth unemployment; various constraints to diversifying the economy; increasing tensions between siting infrastructure while maintaining Bhutan's forest cover; and in the longer term, increasing vulnerability to climate change, particularly though not exclusively in the hydropower sector.

Current policy focusing on priority areas like hydropower, sustainable tourism, expanded value added from agriculture, and other environmentally friendly businesses is a solid base for growth that can be green. The need for policy strengthening also is recognized for addressing the environmental sustainability of ongoing urbanization, as well as increases in mining and manufacturing activity. The question remains as to how and where among these areas of the economy, as well as in forestry, increased green growth measures might further add to growth and meet other economic priorities, without compromising environmental and social norms. Expanded hydropower will do little to increase employment, and expanding agriculture will face the challenge of countering incentives for urban migration as well as the need for adopting higher-productivity approaches. For diversification into other sectors, a number of other barriers need to be confronted.

Our review thus shows that green growth policies in particular sectors and with respect to urbanization need to be complemented by other good growth policies. These include institutional reforms to improve the investment climate, infrastructure upgrading in particular, and increased availability of skilled labor. Policies for how revenues from hydro exports are used and how tourism is expanded, among others, also are needed to generate investments that make growth more sustainable and inclusive.

To conclude, we recommend several cross-cutting steps to deepen knowledge and enrich ongoing policy dialogue:

1. ***Undertaking some rapid growth diagnostics of sectors, building on work already done as part of the preparation of 11th FYP while also identifying opportunities for greening growth.*** Of particular interest would be exploration of the potential generation of income and employment through a sustainably forest products industry, including timber and non-timber forest products. For example, the policy to provide direct grants of timber to households for home construction could be hampering the development of an efficient domestic building products industry. Another topic for investigation would be the potential development of other industry sectors beyond those currently in operation (mainly related to mining), especially the potential for job generation in new "green" product lines while also satisfying applicable environmental standards. Finally, analysis of potential tradeoffs between increasing agricultural productivity on the one hand, and more equitable and green outcomes

on the other, and how these tradeoffs can best be managed, is another area of inquiry. The rapid sector diagnostics could be followed, as appropriate, by more detailed economy-wide analysis of green growth scenarios and policies.

2. ***Development of a natural-resources revenue management framework*** for Bhutan to ensure that the social surplus generated by current natural resource development – especially hydropower, but also minerals, and potentially from forests – can be used to support economic diversification and increases in other forms of societal wealth to support economic progress in the longer term.
3. ***Development of a “sustainable urbanization” framework*** for Thimphu, focusing especially on water quality, waste management, land use, public transport, disaster risk, and service delivery efficiency. In carrying out this task, it is important to note that while improved services increase the value of land, and generate good returns from development, little or no benefit accrues to cities under the current policy system because of low revenue capture by the cities. That in turn reflects extremely low property taxes and limited autonomy of local government. Policy reform on municipal finance management thus is another important link in achieving green growth.
4. ***Capacity building for addressing the environmental, social, and climate change impacts, associated with large-scale hydropower development.*** This would include the capacity to undertake basin-wide studies to assess the cumulative impacts of the development of hydropower projects in cascade along the same river basin, on river hydrology. It would also require capacity to apply innovative, science-based knowledge, tools, and approaches to underpin improvements around watershed planning and implementation, particularly management of sediment and impacts of climate change on the hydropower sector.
5. ***Capacity building for mainstreaming natural capital, including ecosystem services, in Bhutan’s national development planning and national income accounts.*** Given the abundance and economic importance of water resources to support hydropower development in Bhutan, for example, only a fraction of which is currently developed, it is critical that hydropower development be based on a sound management of catchment areas and forest resources to e.g. reduce variations in water flow and to reduce soil erosion. Forests also contribute directly to the economy by providing other goods and supporting the tourism industry. Policymakers need additional information to manage these important natural, economic assets – information not only about the state of forest resources and how it is changing, but also information on how forest resources and ecosystem services are affected by forestry and non-forestry policies. The WAVES initiative¹³ could support the development of (i) *watershed accounts* to assess the value of water regulation and soil retention services from watersheds for hydropower generation to help hydropower development in the state, (ii) *forest accounts* to assess the contribution of forests to the state’s GDP and support policies to increase contribution sustainably, (iii) *mineral accounts* to understand the extent to which rents are being captured, and (iv) *tourism accounts* to inform policies in the tourism sector. Such efforts would complement and strengthen the already

¹³ WAVES (Global Partnership on Wealth Accounting and the Valuation of Ecosystem Services led by the WBG). The WAVES Partnership is funded by an MDTF.

innovative approach in Bhutan to plan and track economic growth – Gross National Happiness Index and Policy Screening Tool.

Box 11: Gross National Happiness

Gross National Happiness (GNH) is the unique development philosophy in Bhutan. It was conceived by the Fourth King His Majesty Jigme Singye Wangchuck. With this philosophy, Bhutan seeks to maximize happiness as the guidance for development, instead of pursuing purely economic growth. The concept allows recognition to not only material needs of individuals, but also spiritual and emotion needs. There are four pillars supporting GNH, i) sustainable and equitable socio-economic development, ii) preservation and promotion of culture, iii) conservation and sustainable utilization and management of the environment, and iv) promotion of good governance.

To implement this philosophy as a guiding principle for Bhutan’s development, the Gross National Happiness Commission make sure that GNH is incorporated in the policies and that proper coordination is undertaken for proper implementation of plans and programs. The GNH index and GNH Policy Screening Tool have been introduced to operationalize GNH. GNH Index helps to track developmental progress over time. The 2010 GNH Index is based on 33 indicators from 9 domains, where the domains are health, education, living standards, ecological diversity and resilience, good governance, psychological wellbeing, time use, community vitality and cultural diversity and resilience. GNH Policy Screening Tool assesses the impacts of introducing new policies and projects on GNH. The tool provides a system to score the projects/policies according to how well they address the nine domains of GNH. The combined score allows decision makers to determine if the project/policy can proceed.

Figure 7



Source: GNH website: <http://www.grossnationalhappiness.com/>
 Gross National Happiness Commission, Royal Government of Bhutan, (2013). “Eleventh Five Year Plan 2013-2018”.
 Planning Commission, Royal Government of Bhutan, 1999. “Bhutan 2020: A Vision for Peace, Prosperity and Happiness”.

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Annex 1 –Funding for Climate Change and Environment

There are two fundamental avenues of financing: public financing and private financing. A long list of sources of funding does exist and the below table attempts to list the main ones. Also, the World Bank and UNDP have developed a website with the objective of helping clients to identify sources of climate finance (<http://climatefinanceoptions.org/cfo/funding-sources>).

Name	Amount	Activities/Objectives	Eligibility/Region/Focus	How to Access	Website
Forest Carbon Partnership Facility (FCPF): The Readiness Fund (Bhutan already accessed)	\$110 million	The Readiness Fund supports tropical and sub-tropical developing countries in preparing themselves to participate in a future, large-scale, system of positive incentives for REDD+. This includes: adopting national REDD+ strategies; developing reference emission levels (RELS); designing measurement, reporting, and verification (MRV) systems; and setting up REDD+ national management arrangements, including proper environmental and social safeguards.	To be selected as REDD Country Participants, the following criteria is considered: being an eligible REDD country (being a borrowing member state of IBRD or IDA, and at tropical or sub-tropical area); relevance of country in the REDD context (significant area and carbon stock of forest, high relevance of forests in the economy, significant deforestation or degradation pressure, and inclusive proposal to approach REDD); Quality of the Readiness Plan Idea Note; balanced approach in geography and biome; and variety of approaches to contribute to the learning objective of the FCPF	The first step for interested countries is to submit a Readiness Plan Idea Note to the FCPF. The next step is for the selected countries to prepare their Readiness Plan, which is a framework for a country to set a clear plan, budget and schedule to undertake REDD+ activities.	http://www.forestcarbonpartnership.org/readiness-fund-0
Forest Carbon Partnership Facility (FCPF): The Carbon Fund	\$51 million	FCPF will pilot incentive payments for REDD+ policies and measures in approximately five developing countries. Such performance-based payments will play an essential part in valuing forests more while they are standing than when they are cut. Payments would provide an incentive to the recipient countries and the various stakeholders—including forest-dependent indigenous peoples, other forest dwellers or the private sector—within each of these countries, to achieve long-term sustainability in financing forest conservation and management programs.	Countries that have made significant progress in their REDD+ readiness endeavors may be selected to participate in the Carbon Fund	FCPF	http://www.forestcarbonpartnership.org/carbon-fund-0
The BioCarbon Fund (BIOCF): Tranche 1 and Tranche 2	Tranche 1: \$53.8 million and Tranche 2: \$29.5 million	The fund focuses mainly on afforestation and reforestation activities and also includes agriculture and REDD+ projects		The BIOCF is housed within the Carbon Finance Unit of the World Bank	https://wbcarbonfinance.org/Router.cfm?Page=BioCF&ft=About

The BioCarbon Fund (BIOCF): BioCFplus	about \$6 million	It supports project development and implementation with capacity building and training, as well as further supports the pioneering role of the BIOCF by developing methodologies and tools for carbon accounting, promoting policy dialogue and by disseminating lessons learned.	Grant funding and technical assistance to support transformational change in developing countries, leading to the implementation of their REDD+ strategies and the creation of enabling environments that change the way land-use decisions are made. Grants will be disbursed through BioCFplus based on performance milestones.		http://www.biocarbonfund-isfl.org/
The BioCarbon Fund (BIOCF): Initiative for Sustainable Forest Landscapes (ISFL)		It seeks to promote reduced greenhouse gas emissions from the land sector, from deforestation and forest degradation in developing countries (REDD+), and from sustainable agriculture, as well as smarter land-use planning, policies and practices, with a focus on but not limited to greening and securing supply chains.	Results-based payments for achieved emission reductions (BioCarbon Fund). The main metric for results-based payments will be carbon emission reductions, but other economic, environmental and social indicators may be monitored. Carbon payments (including some upfront milestone payments) will be made through the BioCarbon Fund. ISFL aims to test carbon accounting at a comprehensive landscape approach, thus including forest, agriculture and possibly energy into a comprehensive methodological approach on which payments will be based	ISFL, the multilateral fund, is managed by the World Bank	http://www.biocarbonfund-isfl.org/
Special Climate Change Fund (SCCF)	Total amount: \$110 million	It is to finance four programs: a) Adaptation; b) Technology Transfer; c) Energy, transport, industry, agriculture, forestry, and waste management; d) Economic diversification for fossil fuel dependent countries.	The prioritized areas are the most vulnerable countries in Africa, Asia, and the Small Island Developing States (SIDS). Areas for adaptation: Water Resources Management, Land Management, Agriculture, Health, Infrastructure Development, Fragile Ecosystems (including mountain ecosystems), Integrated Coastal Zone Management, and Climatic disaster risk management.	Global Environment Facility (GEF). The World Bank has served as the Trustee of the GEF Trust Fund and provided administrative services.	http://unfccc.int/cooperation_and_support/financial_mechanism/special_climate_change_fund/items/3657.php
Least Developed Countries Fund (LDCF)		It is to meet the urgent and immediate adaptation needs of the Least Developed Countries, as identified in their National Adaptation Programs of Action (NAPA, a process for Least Developed Countries to identify priority activities that respond to their urgent and immediate needs to adapt to climate change). The LDCF would provide financing for the 'additional costs,' imposed to development, that pertain to these needs.	The fund is for least developed countries. The key priority sectors/areas of intervention for NAPA implementation through the LDCF will likely include: Water Resources, Food Security and Agriculture, Health, Disaster Preparedness and Risk Management, Coastal Zone Management and Infrastructure, Natural Resource Management, Community-Based Adaptation	Global Environment Facility (GEF). The World Bank has served as the Trustee of the GEF Trust Fund and provided administrative services. GEF will work with parties that have completed their NAPAs to finance each country's priority activities.	http://unfccc.int/cooperation_and_support/financial_mechanism/least_developed_country_fund/items/4723.php

The Adaptation Fund	\$ 223.6 million pledged, \$205.5 million deposited	The Adaptation Fund is to finance concrete adaptation projects which reduce negative impacts from climate change. The activities include: water resources management, land management, agriculture, infrastructure development, fragile ecosystems, disease control and prevention, disaster risk management.	The fund supports developing country parties to the Kyoto Protocol that are particularly vulnerable to the adverse effects of climate change, which includes low-lying coastal and other small island countries, countries with fragile mountainous ecosystems, arid and semi-arid areas, and areas susceptible to floods, drought and desertification. Country allocation also considers the level of vulnerability to climate change; level of urgency and risks arising from delay of action; ensuring access to the fund in a balanced and equitable manner.	Managed by the Adaptation Fund Board (AFB). The GEF provides secretariat services and the WB serves as trustee of the Fund on an interim basis. All applicants must submit project proposals through a National Implementing Entity, a Regional Implementing Entity, or a Multilateral Implementing Entity. Proposals are required to be signed by the Designated Authorities of the country.	https://www.adaptation-fund.org/
Green Climate Fund	\$35.7 million pledged and \$33.6 million deposited	The Fund is expected to be fully operational in 2014. It will contribute to the achievement of the ultimate objective of the UNFCCC. The Fund will promote the paradigm shift towards low-emission and climate-resilient development pathways by providing support to developing countries to limit or reduce their greenhouse gas emissions and to adapt to the impacts of climate change, taking into account the needs of those developing countries particularly vulnerable to the adverse effects of climate change.		The fund is managed by the Green Climate Fund Board and the World Bank serves as the Interim Trustee of the Fund	http://www.gcfund.org/home.html
The Climate Investment Fund (CIF): The Clean Technology Fund (CTF)	\$5231 million pledged and \$4588 million deposited	The Clean Technology Fund (CTF) provides middle income countries with highly concessional resources to explore options to scale up the demonstration, deployment, and transfer of low carbon technologies in renewable energy, energy efficiency, and sustainable transport.	Countries' access of the fund is based on ODA eligibility as well as having an active MDB country program. Channeled through the multilateral development banks (MDBs), CTF concessional financing focuses on large-scale, country-initiated projects in: renewable energy, sustainable transport, energy efficiency.	The CTF Trust Fund Committee oversees the Fund's operations, provides strategic direction, and also approves and oversees its programming and projects. IBRD serves as the Trustee for the Climate Investment Fund (CIF). If a country is interested in the CTF, MDBs concerned will conduct a joint mission, to discuss how the fund may help finance scaled-up low carbon activities and investment plans will be developed. The plans will be submitted to Committee for endorsement.	https://www.climateinvestmentfunds.org/cif/Clean_Technology_Fund

<p>The Climate Investment Fund (CIF): The Strategic Climate Fund (SCF)</p>		<p>It serves as an overarching framework to support three targeted programs for scaled-up, transformational action aimed at a specific climate change challenge or sectoral response: The Forest Investment Program (FIP) to support developing countries' efforts to reduce emissions from deforestation and forest degradation; the Pilot Program for Climate Resilience (PPCR) to pilot and demonstrate ways to integrate climate risk and resilience into core development planning, while complementing other ongoing activities; the Program for Scaling-Up Renewable Energy in Low Income Countries (SREP) to demonstrate the social, economic, and environmental viability of low carbon development pathways in the energy sector as well as to create new economic opportunities and increase energy access through the production and use of renewable energy.</p>		<p>The SCF Committee was established to oversee and decide on the operations and activities of the SCF. IBRD serves as the Trustee for the Climate Investment Fund (CIF).</p>	<p>https://www.climateinvestmentfunds.org/cif/Strategic_Climate_Fund</p>
<p>The Clinton Foundation</p>		<p>Climate Change is one of the issue areas for the foundation. Projects are developed to build more energy efficient cities, promote clean energy, and reverse deforestation.</p>			<p>http://www.clintonfoundation.org/our-work/by-topic/climate-change</p>
<p>Global Energy Efficiency and Renewable Energy fund (GEEREF)</p>	<p>€ 108 million</p>	<p>GEEREF is a Fund-of-Funds advised by the European Investment Bank Group, which invests in private equity funds concentrating on infrastructure projects that generate clean power through proven technologies with low risk.</p>	<p>GEEREF invests in specialist funds developing small to medium-sized projects in the following sectors: Renewable Energy (including small hydro, solar, wind, biomass and geothermal) and Energy Efficiency (including waste heat recovery, energy management in buildings, co-generation of heat and power, energy storage and smart grids). GEEREF engages with funds early in their development and seeks to enhance strategy, team capability and structure, being often the first cornerstone investor in a fund. The GEEREF's funds are characterized with:</p> <ul style="list-style-type: none"> •Strong technical and private equity transaction skills; •A regional focus, an established local presence and networks to generate deal-flow; and •An overall size of between € 50 million and € 200 million. 	<p>European Investment Bank Group</p>	<p>http://geeref.com/</p>

International Climate Initiative (IKI)	a sum of at least €120 million is available to be used by initiative each year	The initiative of the BMUB (German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety) is to finance climate and biodiversity projects in developing and newly industrializing countries, as well as in countries in transition. The Initiative places clear emphasis on climate change mitigation, adaption to the impacts of climate change and the protection of biological diversity.	The points applies to BMUB-funded projects are as follows: The IKI supports mechanisms for mobilizing additional funding, private investments in particular, as well as sustainable business models for climate change mitigation and biodiversity conservation measures; follows technologically, environmentally, methodologically or institutionally ambitious and replicable approaches that are transferrable and that achieve results beyond individual projects: supports its partner countries in making measurable, reportable and verifiable (MRV) contributions to climate change mitigation.	The Programme Office International Climate Initiative supports BMUB is implementing the IKI. It evaluates project applications and submits them to BMUB, which takes the final decision. Projects are primarily selected through an ideas competition.	http://www.international-climate-initiative.com/en/about-the-iki/
UN-REDD Programme	\$ 215.2 million deposited, \$195.7 million approved budget	The UN-REDD Programme is a collaborative programme of UNDP, UNEP and FAO designed to provide technical and financial support to developing countries to develop the capacities necessary to implement REDD+ (REDD+ readiness capacities) and benefit from its social, economic and environmental opportunities. The UN-REDD Programme supports nationally-led REDD+ processes and facilitates involvement of all stakeholders, including Indigenous Peoples and other forest-dependent communities, in national and international REDD+ implementation. The support is from two streams: direct support of design and implementation of UN-REDD National Programmes, and also complementary support through common approaches, analyses, methodologies, tools, data and best practices.		Administration of the UN-REDD Programme MDTF is entrusted to the Multi-Partner Trust Fund (MPTF Office) of UNDP. The REDD+ technical and policy advisors of the Participating UN Organizations will support the development of National Programme documents at the country level. The draft National Programme document will be submitted to the UN-REDD Programme Secretariat on behalf of the national government by the Resident Coordinator, and will be presented to the UN-REDD Programme Policy Board for funding allocation and budget approval. After revision and fulfilling quality assurance requirements, the Multi-Partner Trust Fund Office will release funds to the Participating UN Organization(s) receiving the signed National Programme document and Submission Form.	http://www.un-redd.org/AboutUN-REDDProgramme/tabid/102613/Default.aspx

Climate Change Fund (CCF) from Asian Development Bank (ADB)	\$ 50 million	The CCF is to facilitate greater investment in developing member countries (DMCs) to effectively address the causes and consequences of climate change.	All developing member countries (DMCs) are eligible for CCF resources. Types of activities that may qualify for CCF support are: preparation of relevant strategies or action plans for ADB, its regional departments, and DMCs; investment in climate change mitigation or adaptation measures; development of knowledge products and services related to climate change; facilitating knowledge management activities, including regional conferences and workshops; funding to off-set ADB's corporate carbon footprint. The CCF focus on three areas: clean energy, sustainable transport and low-carbon urban development; reduced emission from deforestation and degradation and improved land use management; and adaptation.	The CCF resources are used to service DMCs and can be tapped through ADB's operations department. The Fund Manager will review the applications by batches to ensure that they comply with the Implementation Guidelines for the use of funds and the eligibility criteria. If so, application will be submitted to the appropriate working group for endorsement. After completion, the Fund Manager will forward the batch to the Climate Change Steering Committee to approve the allocation of resources from the CCF.	http://www.adb.org/site/funds/funds/climate-change-fund
Clean Energy Financing Partnership Facility (CEFPF) from ADB		The CEFPF was established to help improve energy security in developing member countries and decrease the rate of climate change by financing the deployment of new, more efficient and less polluting supply and end-use technologies, through either grant or non-grant resources.	All DMCs are eligible for CEFPF resources and eligible activities are: biomass, biofuel, biogas; rural electrification and energy access; distributed energy production; waste-to-energy projects; demand-side management projects; energy-efficient district heating, transport, street lighting, buildings and end-use facilities; clean energy power generation, transmission, and distribution; manufacturing facilities of clean energy system components, high efficiency appliances and industrial equipments; energy service companies development; carbon capture and storage; integrated gasification combined cycle or IGCC, supercritical and ultra-supercritical steam technologies. CEFPF can potentially invest in the followings to support finance policy, regulatory, and institutional reforms that encourage clean energy development: deployment of new clean energy technology; projects that lower the barriers to adopting clean energy technologies; projects that increase access to modern forms of clean and efficient energy for the poor; technical capacity programs for clean energy	CEFPF resources are used to service DMCs and can be tapped through ADB's operations department. The Clean Energy Working Group will review and endorse project proposals. The Climate Change Steering Committee allocates resources to selected project proposals, and then the approval of the proposed CE project follows the normal ADB procedure.	http://climatefinanceoptions.org/cfo/node/3327

<p>The Global Climate Change Alliance (GCCA) (already has a programme with Bhutan)</p>	<p>€243 million from the EC budget committed 2008-2012, further €47 million committed in 2013</p>	<p>The GCCA is an initiative of the European Union (EU), and coordinated by the European Commission (EC), aimed at strengthening dialogue and cooperation on climate change with developing countries most vulnerable to climate change and supporting their efforts to develop and implement adaptation and mitigation responses. It focuses on the Least Developed Countries (LDCs) and the Small Island Developing States (SIDS). It focus on two pillars: provide platform for dialogue between EU and developing countries on climate policy; and provides technical and financial support to targeted developing countries to integrate climate change into their development policies and budgets and to implement adaptation and mitigation interventions</p>	<p>To be eligible for GCCA funds, a country has to be among the 73 LDCs or SIDS that are recipients of aid. An assessment is made of each country's vulnerability to climate change, in particular the risks related to floods, droughts, storms, sea level rise or glacier melting and the coastal zone elevation, taking into account the proportion of the population at risk. The importance of the agricultural sector, which is one of the sectors most sensitive to climate change, is also included in this assessment. The country's adaptive capacity and how engaged they are in the dialogue on climate change is also assessed. Five areas are prioritized for technical support: mainstreaming climate change into poverty reduction and development efforts; adaptation; reducing emissions from deforestation and forest degradation (REDD); enhancing participation in the global carbon market; and disaster risk reduction (DRR).</p>	<p>Governments must express an interest in receiving support from the GCCA. Funds are then allocated to countries based on availability of resources and on population figures.</p>	<p>http://www.gcca.eu/</p>
<p>Adaptation for Smallholder Agriculture Programme (ASAP)</p>	<p>US\$240 million of commitments and pledges</p>	<p>The programme was launched by the International Fund for Agricultural Development (IFAD) to support climate and environmental finance for smallholder farmers so they can access the information tools and technologies that help build their resilience to climate change. It provides a new source of co-financing to scale up and integrate climate change adaptation across IFAD's new investments.</p>	<p>Grant will co-finance IFAD baseline investments in rural development, focusing on climate resilience for smallholder farmers..</p>	<p>ASAP grants are blended with IFAD baseline investments, and do not employ specific application procedures.</p>	<p>http://www.ifad.org/climate/asap/index.htm</p>
<p>Climate Finance Innovation Facility (CFIF)</p>	<p>€28.3 million</p>	<p>The facility supports finance-industry engagement in the new climate sectors Renewable Energy and Energy Efficiency. The Facility provides developing country financial institutions with technical assistance and funding for the development of climate focused financial products and services. CFIF provides funding support in the form of grants for eligible financial product development activities. The support covers up to 50% of actual costs, dispersed in milestone based tranches. CFIF can also provide direct technical advisory services up to a maximum of 20% of total support provided.</p>	<p>The selection criteria is as follows: innovativeness and market potential of the proposed financial product or service (i.e., technically, commercially, geographically); institutional and financial capacity of the applicant to develop new products for the low carbon energy sectors; optional short-list of consultants who could provide the technical assistance services; applicants include financial institutions operating in developing countries of the Asia-Pacific region are eligible</p>	<p>Financial institutions should make contact with the Facility to discuss a prospective application before submitting any documentation. The application requires submission of product/programme concept note and then successful submissions will be short listed and invited to submit full proposals.</p>	<p>http://climate-finance.org/#01</p>

<p>GEF Small Grants Programme (GEF SGP)</p>	<p>the max grant amount is \$50,000 per project, but averages around US\$25,000</p>	<p>The programme provides financial and technical support to projects that conserve and restore the environment while enhancing people's well-being and livelihoods. SGP demonstrates that community action can maintain the fine balance between human needs and environmental imperatives. The programme provides grants of up to \$50,000 directly to local communities including indigenous people, community-based organizations and other non-governmental groups for projects in GEF focal areas: Biodiversity, Climate Change Mitigation and Adaptation, Land Degradation and Sustainable Forest Management, International Waters and Chemicals.</p>	<p>To be eligible, the applicants need to be an NGO/CBO (community-based organizations) in an SGP participating country. The proposed project needs to correspond to one of GEF focal areas and is aligned with the Country Programme Strategy (CPS) of the country. The applicant also needs to be one of the followings: a non-government organization, a community-based organization or a grassroots organization.</p>	<p>The project proponent can contact the SGP National Coordinator to receive application guidelines and forms and then prepares a brief project concept paper to submit. Reviewed by national coordinator to be eligible, project proposal should be prepared by project proponent and submitted by National Coordinator to the National Steering Committee (NSC). The NSC reviews and determines if the proposal is accepted and approved.</p>	<p>https://sgp.undp.org/index.php</p>
<p>The Nagoya Protocol Implementation Fund (NPIF)</p>		<p>The fund is to facilitate the early entry into force and implementation of the Protocol. (The Nagoya Protocol is supplementary agreement to the Convention on Biological Diversity (CBD), which provides a transparent legal framework for the effective implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources.) Activities include: pursue opportunities leading to ABS (Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization) agreements between users and providers of genetic resources; promote technology transfer, private sector engagement, and projects targeting investments in the conservation and sustainable use of genetic resources in-situ; build capacity among indigenous peoples and local communities; further the knowledge and scientific-base for the implementation of the protocol; review capacities and needs on ABS with focus on existing policies, laws and regulations that compliments investment from the GEF Trust Fund.</p>	<p>The NPIF assists eligible developing countries and countries in transition economy that are signatory countries and those in the process of signing the Nagoya Protocol, and that intend to ratify the Protocol in order to accelerate the ratification and implementation of the Protocol. Projects under the NPIF are supported mainly through the GEF Medium Size Project modality (\$1 million or less). Full size projects (above \$1 million) can also be pursued.</p>	<p>Global Environment Facility. The World Bank serves as its Trustee.</p>	<p>http://www.thegef.org/gef/category/keywords/nagoya-protocol-implementation-fund-npif</p>

<p>Funds that support carbon market</p>	<p>There are also funds to facilitate carbon credits trading to mitigate greenhouse gas emission, including investing in projects to produce emission reduction, promote emission trading, and market innovation.</p>		<p>Such funds include: Community Development Carbon Fund (CDCF), Prototype Carbon Fund (PCF), Danish Carbon Fund (DCF), Spanish Carbon Fund (SPF), The Carbon Partnership Facility, Partnership for Market Readiness (PMR), The Climate Change Technical Assistance Facility (CCTAF), EIB Post-2012 Carbon Credit Fund, etc.</p>	
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