



Low carbon competitiveness in Nepal

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Policy brief

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Key messages

- Climate change, international mitigation policies, and natural resource scarcity will transform global trade patterns over the next decade, creating opportunities and threats for Nepal's competitiveness and sources of growth. Policy-makers and businesses should act now to manage the risks and capitalise on the opportunities.
- The potential to develop hydropower in Nepal is substantial, and would significantly enhance competitiveness and growth; but a diversified energy mix would improve resilience to the potential impact of climate change on hydropower generation. Fossil fuel subsidies will significantly undermine competitiveness in a future carbon constrained global economy with high energy prices.
- The unsustainable exploitation of forests can undermine growth and competitiveness by jeopardising forest-dependent livelihoods and depleting natural assets. Incentives to protect the forest can be created by developing commercial opportunities that rely on sustainable forest management, such as ecotourism, or products such as medicinal and aromatic plants.
- Further growth of the tourism industry could yield significant economic and environmental benefits, but needs to be managed appropriately to ensure the sustainability of that growth, and to create a competitive advantage by strengthening Nepal's brand as a green tourism destination.

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Abbreviations

Abbreviation	Description
ADB	Asian Development Bank
AEPC	Alternative Energy Promotion Centre
ANSAB	Asia Network for Sustainable Agriculture and Bioresources
CBS	Central Bureau of Statistics
CDKN	Climate and Development Knowledge Network
CDM	Clean Development Mechanism
CF	Community Forests
CFD	Community Forestry Division
CFUG	Community Forest User Group
DECC	Department of Energy & Climate Change (UK)
DFID	Department for International Development (UK)
DFO	District Forest Office
DNPWC	Department of National Parks and Wildlife Conservation
DoF	Department of Forests
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization of the United Nations
FCTF	Forest Carbon Trust Fund
FECOFUN	Federation of Community Forestry Users
FGD	Focus Group Discussion
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GHT	Great Himalaya Trail

GMP	Good Manufacturing Practice
ICIMOD	International Centre for Integrated Mountain Development
IEA	International Energy Agency
IEE	Initial Environmental Examination
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
LCCD	Low carbon competitiveness diagnostic
LFP	The Livelihoods and Forestry Programme
MAPs	Medicinal and aromatic plants
MAST	Marketing Assistance for Sustainable Tourism
MoFSC	Ministry of Forests and Soil Conservation
MOPE	Ministry of Population and Environment
MSFP	Multi Stakeholder Forestry Program
MW	Megawatt
MWp	Megawatt-peak
NAPA	National Adaptation Programme of Action
NEA	Nepal Electricity Authority
NEEP	Nepal Energy Efficiency Programme
NETIF	Nepal Environment and Tourism Initiative Foundation
NTIS	Nepal Trade Integration Strategy
NORAD	Norwegian Agency for Development and Cooperation
NOC	Nepal Oil Corporation
NPR	Nepalese Rupee
NTB	Nepal Tourism Board
NTFP	Non-timber forest product
PV	Photovoltaic
RAP	Rural Access Programme
REDD	Reducing Emissions from Deforestation and Forest Degradation
SPS	Sanitary and phytosanitary measures

UNEP

United Nations Environment Programme

WECS

Water and Energy Commission Secretariat

1 Introduction

The Nepal Trade Integration Strategy 2010 identified the expansion of trade as one of the key drivers of inclusive growth in Nepal going forward. This and the more recent Immediate Action Plan on Economic Development and Prosperity, published in 2012, set out a number of policies to promote export competitiveness and growth. The success of these policies will depend to a large extent on the global trade patterns shaping the opportunities that Nepal faces.

Our analysis suggests that over the next 10 years, global trade patterns will be transformed by climate change, international mitigation, and natural resource scarcity, resulting in an inevitable shift over time to a low carbon global economy. This study has been asking what this might look like. What impact will it have on Nepal's competitiveness and growth? What threats and opportunities will it create? And how should policy-makers and businesses respond?

Achieving competitiveness is important for achieving growth and development, and most countries are keen to identify and support domestic sectors where they may have a competitive advantage. At the same time, many countries are developing green growth or climate compatible development strategies in order to promote sustainable growth trajectories. Yet these two sets of analysis are rarely brought together to ask how climate change, mitigation policies and natural resource scarcity will affect patterns of trade and comparative advantage at the global level, or to assess the implications of these global changes for national policy.

These questions are the subject of a research programme that aims to analyse how these drivers might affect economic prospects in low-income countries (LICs), and how they might achieve 'low carbon competitiveness' (i.e. remain or become competitive in a future, low carbon global economy), and to develop a 'Low Carbon Competitiveness Diagnostic' (LCCD), a framework to help policy-makers analyse these issues in their own particular country context. The study does not purport to provide detailed policy recommendations, as that can be done only on the basis of much more detailed analysis. It simply aims to highlight these drivers of change and their possible impacts, to demonstrate the importance of taking these trends into account when designing a national growth policy, and ultimately to provide a diagnostic tool to assist with this analysis at the national level.

The programme explores these issues through case studies in three LICs: Cambodia, Kenya and Nepal. The aim is to raise awareness and stimulate discussion about the issues at the national level in these three countries, while at the same time facilitating the development of the diagnostic tool, which would be applicable to a wider set of LICs. Once again, the objective is not to provide detailed policy recommendations but rather to set out some possible policy and business responses to the issues identified responses that would require further discussion and much more detailed analysis in each particular country context. This Policy Brief is the output of the case study in Nepal.

1.1 Changing global trade patterns

The underlying hypothesis of this study is that the three drivers – increasing natural resource scarcity (particularly with the growing global demand for energy), the impact of climate change, and the impact of international climate change mitigation policies – will inevitably create transformational shifts in prices and patterns of production and demand in future. And the changes in competitiveness patterns

generated are likely to have implications for countries' growth strategies, and also for their incentives to achieve low carbon growth. For example:

1. Increasing natural resource scarcity – particularly relating to energy, land and water, and partly driven by economic growth in the emerging economies – will result in (for example)
 - higher oil prices, reducing the competitiveness of energy-intensive industries in oil importing countries, which could enhance incentives for energy-efficiency measures in those countries
 - increased competition for land and water, which could strengthen incentives for effective natural resource management and sustainable agricultural practices that improve land and labour productivity.
2. Mitigation policies introduced at the global level or by trading partners, which may affect export opportunities or import prices faced by developing countries, could result in (for example)
 - new standards requiring carbon footprinting of production in some sectors, potentially reducing access to markets for relatively energy-intensive products or products which are not certified
 - carbon taxation, which could lead to certain energy-intensive industries shifting to non-mitigating countries (often termed 'carbon leakage'), generating a possible trade-off between competitiveness and low carbon growth
 - increased climate finance to support the development of new green industries such as renewables (most likely from public funding sources in the short term, in the absence of well-functioning carbon markets).
3. The impact of climate change – in the sense of planetary warming – will be significant for some sectors. For example, climate change
 - will reduce yields and productivity of certain agricultural crops, undermining competitiveness of those products
 - is reducing the efficacy of certain renewable energy sources, such as hydropower, in certain contexts, undermining the competitiveness of countries reliant on them
 - threatens the prospects for tourism development by increasing the incidence of extreme weather events and by reducing water supplies.

1.2 The potential impact on countries' competitiveness and sources of growth

These changes could have significant implications for the sources of competitive advantage, growth, and economic opportunity that countries will face going forward. Our initial analysis suggests that a desire to remain competitive in the face of these drivers will generate a business case for low carbon investment in some sectors. This is particularly important in light of the poor state of carbon markets, which were previously seen as a key mechanism for funding the transition towards a low carbon growth trajectory in developing countries. In the absence of this funding, understanding the economic incentives that could help drive such a transition even in the absence of carbon markets will be key to developing smart and well-targeted policy and donor support mechanisms in the short and medium term.

However, in other cases there will be trade-offs between maintaining short-term competitiveness and achieving low carbon growth. Therefore, the analysis will aim to identify both synergies and trade-offs and identify implications for policy and donor support.

Policymakers are also faced with great uncertainty, relating for example to:

- Fossil fuel discoveries and technological innovation which will affect the evolution of energy prices going forward;
- Future global and national climate change policy regimes;

-
- The impact of climate change itself on different countries and economic activities;
 - How patterns of demand will change in response to the three global drivers identified.

In this work we have posited various outcomes in different sectors based on existing knowledge and trends, but in many cases scenario analysis is warranted when weighing up different policy options, to take account of the uncertainties surrounding various factors. It is intended that the LCCD to be developed as the final output of this research programme will provide guidance on how scenario analysis could be implemented to assist with decision-making. This uncertainty also highlights the need for countries to adopt approaches to policy-making that allow for uncertainty, by building in flexibility and keeping options open for example.

This study focuses on the opportunities and risks facing LICs in particular. Previous ODI analysis suggests that competitiveness and growth prospects in LICs will be significantly affected by the global trends discussed above, through their impact on trade patterns (Ellis et al, 2010). Thus, competitiveness strategies in LICs will need to be reassessed if they are to be resilient in the face of these changes.

The analytical framework for this study was set out in an ODI Working Paper (Ellis, 2013). It identifies a number of transmission mechanisms through which the three drivers identified (natural resource scarcity, climate change and international mitigation) could potentially affect competitiveness, including

- the creation of new markets (domestic or international) or a reduction in the size of existing markets
- changes in prices of exports and imports due to changes in global supply and demand
- changes in costs due to changes in input prices
- changes in flows of foreign direct investment, and location decisions by multinationals
- impacts on the value of assets such as land, water resources, fossil fuel reserves, forests, etc.
- increased climate finance
- higher standards demanded in global value chains, and requirements for certification and labelling
- technology transfer.

1.3 The case study approach

The potential impacts identified in the analytical framework have now been assessed in detail in three case study countries: Cambodia, Kenya and Nepal. This Policy Brief is the output of the case study in Nepal.

The research programme covers the five tradable sectors of most relevance in terms of the trading and production patterns of low income countries: agriculture, forestry, energy, tourism and manufacturing. In each country case study we focused on three sectors; the energy sector was an area of focus in all three countries, given its pivotal position both in determining overall country competitiveness and as a potential export industry. The other two sectors were selected for each country depending on existing patterns of production and potential, and with the objective of covering the five tradable sectors listed above across the three country case studies. In Nepal we have focused on the energy sector, the forestry sector and the tourism sector. We have looked at the issues in agriculture and manufacturing through the other case studies.

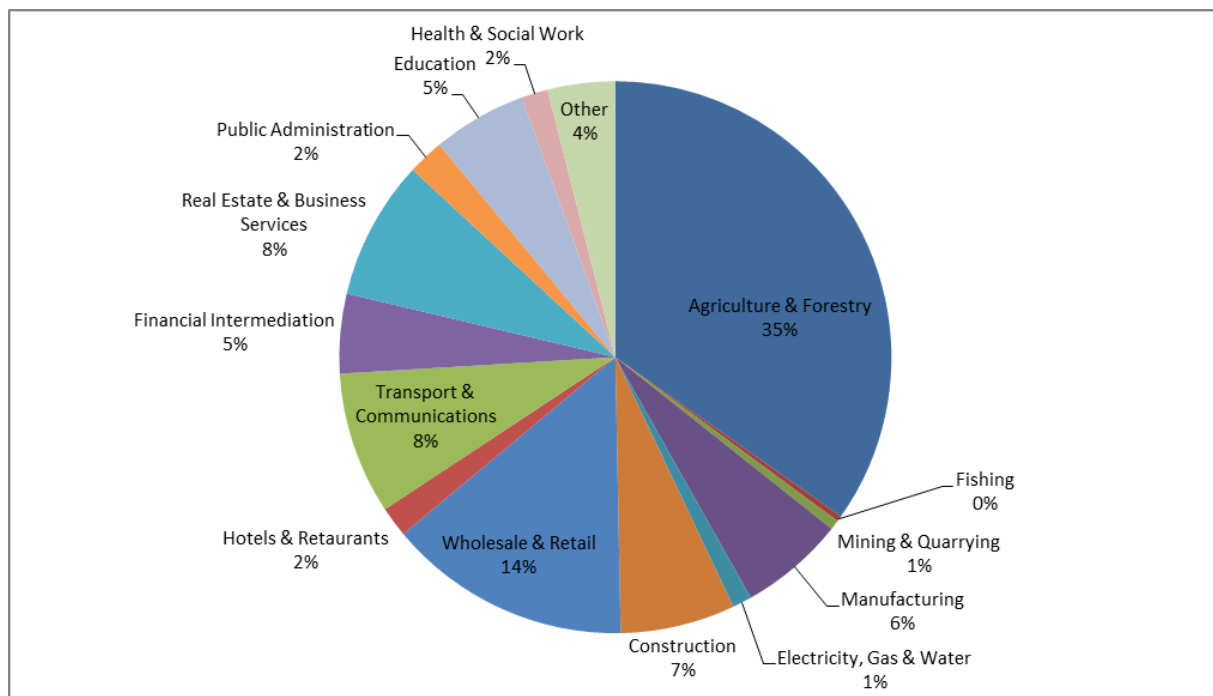
The remainder of this Policy Brief sets out the findings from the Nepal case study. Chapter 2 provides some background in the form of a brief description of Nepal's existing economic structure and growth dynamics; challenges and opportunities for growth and competitiveness as identified in recent studies and indices; and the country's growth and climate change response strategies. The Brief then examines

the energy, forestry and tourism sectors in turn, discussing the various opportunities and threats they face, and possible implications and policy responses.

2 The economic context in Nepal

Nepal's economy grew by 4.63% in 2011/12, in line with a long-term trend that has seen an annual average growth rate of 4.4% over the period 1994 to 2012 according to Nepal's Central Bureau of Statistics (CBS). Figure 1 below shows the importance of different sectors to the economy, and shows that agriculture and forestry play an important role, accounting for over a third of Gross Domestic Product (GDP), while manufacturing represents only 6% of GDP and hotels and restaurants only 2%, although tourism has been growing in importance (CBS, 2012).

Figure 1: Nepalese GDP by sector (2011)



Source: CBS (2012)

2.1 Challenges and opportunities for growth

Table 1 below shows how Nepal scores on a number of key competitiveness-determining indicators from the Global Competitiveness Index (GCI) (World Economic Forum (WEF), 2012), as compared with a number of other countries. Nepal scores lower than most of its regional competitors on most indicators.

Table 1: 2012-13 WEF GCI scores for selected indicators – Nepal competitors

	Nepal	Kenya	Cambodia	India	Bangladesh	China
Overall rank (2012-13)	125th	106th	85 th	59th	118th	29th
Quality of electricity supply	1.4	3.6	3.6	3.2	1.8	5.2
Quality of infrastructure	2.9	4	4.2	3.8	2.8	4.3
Quality of roads	2.6	3.9	4	3.5	2.8	4.4
Mobile tel./100 pop.	43.8	64.8	69.9	72	56.5	73.2
Broadband subs./100 pop.	0.3	0.1	0.2	1	0	11.6
No. of procedures to start a business	7	11	9	12	7	14
No. of days to start a business	29	33	85	29	19	38
Availability of financial services	3.9	4.7	4.4	5	4	4.6
Affordability of financial services	3.7	4.4	4.2	4.9	3.7	4.6
Availability of latest technologies	4.3	4.9	4.8	5.3	4.4	4.4
Firm-level technology absorption	4.1	4.9	4.9	5.2	4.2	4.7
Capacity for innovation	2.4	3.5	3.2	3.5	2.4	4.1
Quality of education system	3.4	4.3	3.9	4.4	3.2	3.9

Source: WEF (2012)

On the Environmental Performance Index the situation is reversed, however, as shown in Table 2. Nepal fared substantially better than its regional competitors, achieving the top score for the forestry cover indicator, and much higher scores than most of its regional competitors for water resources.

Table 2: Selected indicators from the Environmental Performance Index (2012)

	Nepal	Kenya	Cambodia	India	Bangladesh	China
EPI Rank	38 th	83 rd	59 th	125 th	115 th	116 th

Agriculture Score	40.9	22.6	66.7	11.7	66.7	41.1
Forest Cover Score	100	75	28.3	98.1	81.4	93.2
Air Quality Score	55.2	58.5	64.4	38.9	63.7	18.2
Water Resources Score	37.3	39.4	45.3	6.9	14.2	12.2

Source: Yale (2012)

The Asian Development Bank (ADB) (2009) has identified a number of key constraints to growth in the Nepalese economy including the following:

- *Low Domestic Savings:* The rate of domestic savings is low within Nepal; in 2009 it stood at 9.4% of GDP. The low level of domestic savings is, however, boosted by high levels of inward remittances, which accounted for about 17% of the nation's GDP in 2009.
- *Governance:* The country's poor governance capacity, which contributed to, and was exacerbated by the civil war that began in 1996. The war diverted resources away from development-oriented projects and towards defence and security activities, which delayed key projects such as the development of hydroelectric power.
- *Investment Gap:* The declining amount of public sector investment (a 60% decrease) was meant to incentivise private sector investment, including in the infrastructure sector; however, private sector investment in infrastructure has remained fairly low.
- *Infrastructure:* The lack of reliable energy and transport infrastructure is a major constraint to growth in the economy. The country has low national electrification rates, and electricity prices are amongst the highest in the Southeast Asian region, reducing the competitiveness of Nepalese enterprises.

2.2 Nepal's growth and climate change response strategies

In 2012, the Government of Nepal published an Immediate Action Plan on Economic Development and Prosperity, which set out an array of activities to promote growth, development and job creation in a wide variety of sectors including energy, tourism, agriculture, infrastructure and forestry, among others – although it did not provide detailed sectoral analysis. The plan envisaged the creation of more than half a million jobs within half a year, with tourism and energy cited as two of the most important drivers of employment generation. It set out specific tasks and ministerial responsibilities, along with expected outcomes and deadlines for action, many of which have already passed.

Nepal also published a National Adaptation Programme of Action (NAPA) in 2010 that aimed to assess the country's climate vulnerability and to develop effective adaptation measures. The NAPA identifies adaptation actions required in a number of sectors, including agriculture and forestry, and builds on existing development strategies for those sectors. However, it does not explicitly address competitiveness issues.

Neither the NAPA nor the Action Plan consider future changes in trading opportunities resulting from climate change, mitigation, and natural resource scarcity. This study can therefore add considerable value to the sectoral analysis that has been undertaken to date, and facilitate the discussion of appropriate policy responses.

3 The energy sector

Nepal has one of the smallest carbon footprints in the world. Per capita emissions of greenhouse gases are 0.1 tonne per year, a small fraction of the emissions in industrialised countries and much lower than per capita emissions in its two large neighbours India (1.6 tonne/capita) and China (5.8 tonne/capita).¹ Nepal's grid electricity is among the cleanest in the world (3 grammes CO₂e per kWh). The country's low-income status and late development start, reflected in low per capita energy consumption, are clearly part of the explanation for Nepal's current low carbon economy. Geography and the country's natural resource endowment are also part of the explanation. It is estimated that less than 1% of Nepal's hydropower potential has been exploited.

The availability and reliability of energy, especially electricity, are major constraints on growth, competitiveness and living standards in Nepal. Close to 60% of the population has no access to electricity, and those who do get electricity from the grid are currently subject to 12 or more hours a day of load shedding. In the World Economic Forum's 2012-13 *Global Competitiveness Report*, Nepal was ranked 143rd, out of 144, for the quality of its electricity supply.

Renewable energy is set to become increasingly cost competitive as technologies mature, with some renewable energy costs (e.g. solar, wind) already falling (Brown et al., 2011). In rural and remote locations, decentralised renewable energy generation is often the most cost-effective option (Intergovernmental Panel on Climate Change (IPCC), 2011), and its expansion – potentially supported by new forms of climate finance – can support increased economic development and improved competitiveness in those areas.

For Nepal's growth and competitiveness, in the context of an increasingly carbon-constrained world, the key questions for the energy sector are how to increase supply and whether this can be done in a timely way without dramatically increasing energy-related greenhouse gas emissions.

3.1 The demand for energy

Total final energy consumption in Nepal was 9,878 ktoe ('000 tonnes oil equivalent) in 2009.² Residential consumption accounted for 88% of this, comprising mainly biomass consumption, predominantly for cooking. Of the remaining 12%, almost half (47.7%) was consumed by the transport sector, 30% by industry, 13% by services, and just over 9% by agriculture. See Table 3.

Table 3: Composition of total final energy consumption in 2009

	Coal and Peat	Oil Products	Biofuels and Waste	Electricity	Total (ktoe)
Industry	193	21	52	87	353
Transport	0	571	0	1	571
Residential	1	133	8450	99	8682

¹ World Development Indicators (<http://data.worldbank.org/indicator/EN.ATM.CO2E.PC>).

² International Energy Agency (http://www.iea.org/stats/balancetable.asp?COUNTRY_CODE=NP).

Commercial and public services	0	73	50	32	155
Agriculture and forestry	0	109	0	5	113
Non-specified	0	0	0	4	4
Total final consumption	193	905	8552	227	9878

Source: IEA (International Energy Agency)

The demand for petroleum products (excluding aviation fuel) can be divided into demand for liquefied petroleum gas (LPG), kerosene, petrol (motor gasoline) and diesel. LPG and kerosene are used mainly for cooking and heating in urban areas. Demand for the former, even in rural areas, has been increasing at the rate of 20% a year (partly to compensate for load shedding), while demand for kerosene is declining. The consumer prices for LPG and diesel are subsidised.

Petrol and diesel are consumed primarily in the transport sector, according to official statistics, as shown in Table 4. In the transport sector, apart from petrol and diesel, there is a very small demand for electricity for ropeways and some vehicles.

Table 4: Consumption of petroleum products by sector 2009

	LPG	Motor gasoline	Kerosene	Diesel gasoline	Total (ktoe)
Industry			2	7	9
Transport	5	115		397	517
Residential	79		36		115
Services	57		5		62
Agriculture / Forestry				99	99
Total	141	115	43	503	802

Source: Water and Energy Commission Secretariat (WECS), 2010

Electricity consumption in 2009 was a little over 2% of Nepal's total energy consumption and 17% of commercial energy consumption. In the residential sector, which accounts for 43% of the electricity consumed, electricity is used mainly for lighting, and increasingly for domestic appliances. In the industrial sector (38% of electricity) is used for motive power, heating and lighting. The number of residential consumers increased by an average of 10% a year between 2003 and 2012, and now stands at over 2.2 million households³.

Overall energy consumption increased by an average of 2.2% a year in the period 2000-2009, lower than GDP growth. Energy consumption by sector for the period is shown in Table 5 below. Consumption grew by an average of 6.3% per year in the transport sector and 3.1% in the services sector, while industrial consumption grew at a slower rate of 1.6% per year on average due to the slow growth of the industrial sector. The Nepal Electricity Authority (NEA) forecast of electricity demand

³ Calculated from NEA Annual Reports.

(depicted in Figure 2) assumes an annual increase of around 9% for the next five years, followed by 8% per year increases to 2027.⁴

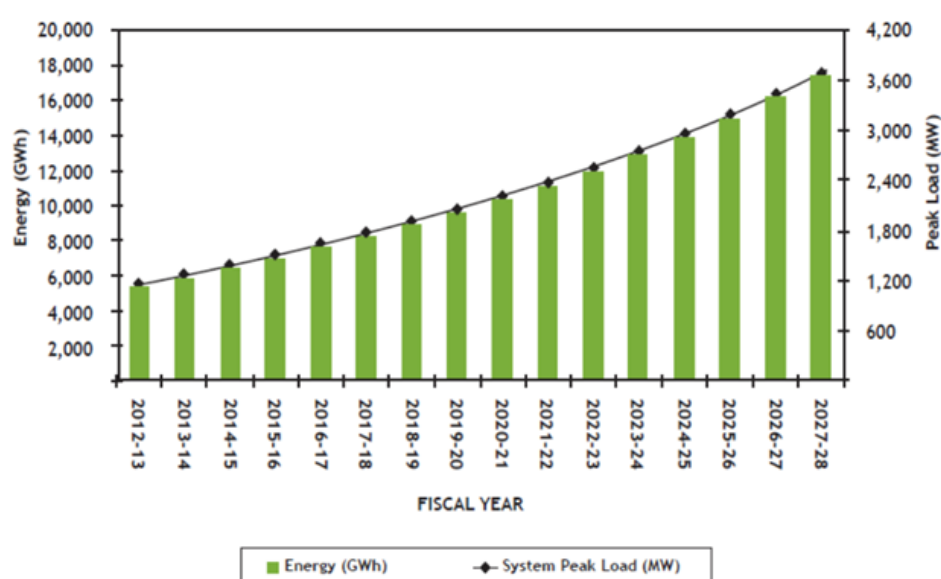
The demand for energy in the transport sector is almost entirely for fossil fuels, despite the emphasis on renewables and a pollution-free transport system in the National Transport Policy, adopted in 2001. Recent investments in extending the road network across the country point to continued growth in the demand for fossil fuels for transport.

Table 5: Energy consumption by sector 2000-2009

	<i>000 GJ</i>								
	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Residential	301142.9	314615.8	320180.1	326248.0	331520.5	337627.5	345384.3	351191.9	356752.1
Industrial	12998.3	12537.0	11969.5	13715.9	12761.3	16839.8	12791.4	13988.7	13369.8
Commercial	4127.6	4921.3	5228.1	5316.1	5335.0	5336.4	4673.8	4885.7	5122.2
Transport	13591.5	12024.6	12702.8	13132.0	13894.2	13469.5	14509.5	15036.6	20876.0
Agricultural	3152.0	2776.2	2888.0	2891.7	3084.7	2888.5	3010.6	2520.8	3646.4
Other	408.5	454.4	484.0	533.3	611.6	624.1	680.3	758.4	739.9
Total	335420.8	347329.3	353452.5	361837.0	367207.3	376785.8	381049.9	388382.1	400506.4

Source: WECS, 2010

Figure 2: Electricity demand and load forecast 2012-2028



Source: NEA Annual Report 2012

⁴ NEA Annual Report 2012.

3.2 Energy supply

3.2.1 Electricity

The total installed capacity for electricity generation is 741.19 MW,⁵ 92% of which is hydropower. This includes 472.9 MW large hydropower and 54.41 MW diesel thermal in the public sector, and 158.3 MW medium and small hydropower owned by independent power producers (IPPs). Off-grid small hydropower totals an estimated 4.5 MW, and micro-hydro capacity was estimated in 2009 to total 13.9 MW⁶.

For several years, the supply of electricity from the grid (i.e. NEA) has been unable to meet demand. Load shedding has been used to manage the gap between generation capacity and demand, averaging 12 hours a day at present and likely to increase during 2013. In recent years, transmission and distribution losses of around 30% have added to the shortage.⁷ The response of many consumers to load shedding has been to purchase a standby diesel generator. Estimates of the aggregate capacity of these generators were put at 700-800 MW,⁸ which is roughly the same total capacity as NEA's grid-connected plants. In 2012, the Nepal Oil Corporation estimated the aggregate capacity of diesel generators at 531 MW, consuming 40% of the country's diesel.⁹

In 2008 the Government declared a 'national energy crisis' and adopted a 38-point Electricity Crisis Management Plan. This action plan includes demand- and supply-side measures, such as development of large hydropower by the private sector, and investment in infrastructure to enable the import of electricity from India.

The gap between the demand and supply of grid electricity will not be closed for several years. (The NEA's load forecast is shown in Figure 2.) The capacity of new hydropower schemes currently under construction or in planning stages suggests that there will be a gap at least until the end of the current decade.¹⁰ New large hydropower schemes have a long lead time, which now includes extended time for consultation and negotiation with affected communities, who have considerable political power in Nepal today. Though large-scale schemes are a major part of Nepal's strategy to exploit the country's hydropower resources, alternatives are being considered to bring additional generation capacity into service more quickly.

One option proposed by the Government is the construction of a new 200 MW diesel thermal generating plant. Though details of the proposal have not been made available and it is possible that it will not be implemented, such a plant would entail a large increase in diesel consumption and imports.¹¹ The unit cost of power would be relatively high and only some form of subsidy would avoid significant consumer price increases.

Investment in transmission and distribution infrastructure is also needed. Underinvestment in transmission has contributed to a high level of losses, constrained electricity exchanges with India, and limited access to power domestically. Between 2000 and 2010, NEA invested US\$225 million in transmission lines, estimated to be less than 30% of the value of electricity losses (Gautam, 2013). Unaddressed, this under-investment will significantly constrain the potential future expansion of the electricity supply. With sufficient finance, there would in fact be scope for Nepal to leapfrog older grid technologies through the use of more modern and flexible smart grid technology, which would enhance the potential for renewable energy development.

⁵ Department of Electricity Development (www.doed.gov.np).

⁶ There were also 6,253 water mills providing direct mechanical power for grain milling with a total capacity equivalent to 15.2 MW (WECS, 2010).

⁷ Losses in 2011/12 were 26.4% (NEA, 2012), down from 34% in 2010. A proportion of these losses are due to unofficial consumption and poor revenue collection, as well as technical faults and poor maintenance of the infrastructure.

⁸ Estimates provided by informants during interviews in February 2013.

⁹ Kathmandu Today, 7 May 2012. <http://www.ktm2day.com/2012/05/07/diesel-provides-531-mw-of-electricity/>

¹⁰ The addition of 1,375 MW by 2017, from projects recently completed or under construction, would mean a 900 MW gap in five years' time according to one commentator (<http://www.ekantipur.com/2013/01/29/development/energy-efficient-technologies-to-better-rural-lives/366245.html>).

¹¹ Operating 10 hours a day, it would consume 700,000 litres diesel a day or 255,500 kl a year.

3.2.2 Community-based electrification

Since the adoption of Community Electricity Bylaws by the NEA in 2003, more than 230 community electrification schemes have been established, supplying more than 278,000 households. Schemes to connect a further 150,000 households are in different stages of planning. The combination of a grant from the NEA and a 10% contribution¹² to costs from community groups or cooperatives has enabled more families to be connected than has the NEA's own grid extension programme. A local stake in electricity infrastructure and local responsibility for operation and maintenance seems to be an effective model for delivering electricity to rural consumers, with a good record in revenue collection and reduced losses to the NEA.

3.2.3 Solar and wind power

The estimated technical potential for grid-connected solar power is 2,100 MW. However, in 2012, only an estimated total of 13 MW was in use,¹³ including more than 185,000 solar home systems. Subsidies through the Alternative Energy Promotion Centre (AEPC) are available only for rural areas, and there is no feed-in tariff for solar that might encourage the use of solar micro-generation in grid-connected areas, including urban areas. Nepal Telecom is one of the more significant users of solar electricity, with a total 1 megawatt-peak (MWp) generating electricity at 3,000 locations (Water and Energy Commission Secretariat (WECS), 2010). Three-quarters of its public call offices are powered by solar photovoltaic (PV) systems.

Larger-scale solar PV schemes are in prospect, notably with investment from China. The Hunan Yueer Solar Energy Technology Company is planning a 30 MW plant, and a 5 MW scheme is being built to supply government buildings in Kathmandu.¹⁴ The Nepalese Rupee (NPR) 25 billion (US\$280 million) estimated cost of a 200 MW solar plant compares favourably with the diesel thermal option being considered by the Government.

The potential for wind power in Nepal is limited and unevenly distributed. The commercial potential has most recently been estimated at 3,000 MW (AEPC), considerably more than in previous studies. However, the greatest wind power generation potential is in high mountain areas, far from centres of population, and wind power is not a priority under existing plans. Wind pumps for water supplies are an option in the Terai.

3.2.4 Fossil fuels

Nearly all of the coal, oil and gas consumed in Nepal is imported. A small quantity of coal is mined in Dang District, and the rest imported by private enterprises. Oil and gas are imported by the monopoly Nepal Oil Corporation (NOC), which distributes petrol and diesel within the country, and supplies gas to private sector LPG bottlers and distributors. The consumption of petroleum products is increasing, but NOC is not always able to ensure supplies meet demand.¹⁵

The consumer prices of diesel and LPG are subsidised, the subsidy appearing as a loss on the NOC balance sheet. Accumulated losses amount to over NPR 28 billion (approximately US\$315 million). The financial situation of NOC affects its ability to ensure supplies and to invest in distribution infrastructure to meet growing demand. The largest part of NOC's losses comes from consumption of LPG, which is currently sold to consumers at a loss of NPR 531 per cylinder.¹⁶ An attempt to increase the consumer price in February 2013 was withdrawn after one day, following street protests.¹⁷ However, subsidising fuel like this can disincentivise renewable energy investment and energy-efficiency measures by companies, which can in turn undermine competitiveness in the long term. In addition, rising energy prices will make subsidising diesel and LPG less affordable over time, exacerbating public finance problems.

¹² Initially this was 20%.

¹³ Quote from AEPC official in República, 12 October 2012.

¹⁴ República, 12 October 2012.

¹⁵ In February 2013, for example, the monthly supply of 11,000 tonnes LPG was less than half the estimated winter demand of 25,000 tonnes (<http://www.shreedeepayamajhi.blogspot.com>).

¹⁶ <http://www.nepaloil.com.np/main/?opt1=sellingprice&opt2=profitloss>

¹⁷ See: http://www.myrepublica.com/portal/index.php/ads/ads/news_rss.php?action=news_details&news_id=50500

3.2.5 Bioenergy

Biogas

The installation of household biogas digesters has been growing rapidly, and more than 200,000 have been installed nationwide according to one source. Estimates of the potential for biogas in Nepal range from 1.2 million to 2.9 million units. Most of the potential is in the Terai, where conditions are more favourable for biogas production. The promotion of biogas use through AEPC's Biogas Support Programme has resulted in the establishment of around 594 private biogas installation companies and 16 biogas appliance manufacturing enterprises. Subsidised loans for biogas are provided through 163 microfinance institutions (Basnyat, 2011). SNV, which supported the development and promotion of biogas in Nepal, is now turning its attention to commercial biogas plants using animal or agro-waste as feedstock. The introduction of feed-in tariffs could make such investment more financially viable.

Biofuels

Ethanol and biodiesel production in Nepal is at the experimental stage. The area under cultivation for biofuels is small and widely dispersed (ibid.). Though the Government announced a mandate for NOC to sell petrol with 10% ethanol content from January 2004, this has not been implemented. The National Biofuels Programme under AEPC is promoting *Jatropha* for biodiesel production. Two processing plants at Jhumsa, Palpa District, and Ramnagar, Chitwan District, have been established, each with a capacity of 1,000 barrels per day. Two private companies (Everest Bio-Diesel and Crystal Bio-energy) are also exploring the potential of *Jatropha*.¹⁸ The strategy that has been drafted for biofuels proposes the use of waste land for biofuel crop production, and subsidised inputs to farmers. Analysis to date suggests that biofuel production would be unviable without subsidies to farmers (Basnyat, 2011). Given the poor food security of many communities in Nepal, the commercial production of biofuels would have to take account of its effects upon land and water resources. It may also be possible to develop dual crops, which provide both energy and food (e.g. maize, soya beans and sugarcane).

3.3 The impact of climate change

Climate change projections for Nepal suggest there will be rising temperatures and changes in rainfall patterns. Although there is considerable uncertainty around impacts on rainfall, the potential for prolonged dry spells has been identified (Dixit, 2011). Thus climate change could significantly reduce the hydropower potential of Nepal. A Government initiated research project (supported by the Climate and Development Knowledge Network (CDKN)) will examine the evidence about the impact of climate change on hydropower and agriculture with findings due later in 2013.

Most of Nepal's hydropower capacity is run-of-river, so power generation depends on the levels of water in rivers with hydropower schemes. The demand for electricity within Nepal is highest during the dry season, when rivers are at their lowest. Many hydropower plants are now reportedly operating significantly below capacity (50-60%) in the dry season because of low water levels (Shrestha, 2010). Changes in the water resource due to climate change will affect total power generation and the viability of individual schemes. However, research to date has focused on the longer-term effects of climate change, with less being known about short- and medium-term effects (MOSTE, 2013).¹⁹ Uncertainty about the water resource increases the risk for investors, which could translate into higher electricity prices for consumers.

The Government's strategy for energy supply will need to become resilient to the effects of climate change. This perhaps suggests more focus on small hydro, spreading the risk by having more dispersed sites for power generation. It also suggests diversification of renewable energy sources, supporting and enabling investment in solar PV and wind energy. AEPC, along with Practical Action, produced some district-level energy improvement plans that aimed to improve the sensitivity to climate change of energy planning (AEPC, 2011), though it is not clear to what extent the plans have been implemented.

¹⁸ República, 30 June 2012.

¹⁹ Ministry of Science, Technology and Environment (2013) Economic Impact Assessment of Climate Change in Key Sectors in Nepal: Study Inception Report, Kathmandu: Government of Nepal.

3.4 Export potential

The export of hydroelectricity to India has been a subject of debate for many years. It is argued that Nepal's large hydropower potential is a significant resource that could be exploited for economic gain, particularly given the shortage of electricity in India, and the high carbon content of the electricity that is generated there.

One of the barriers to exporting significant amounts of power has been the lack of adequate cross-border infrastructure. Interconnections already exist, and power is exchanged with India, but the capacity is limited. The Muzaffarpur-Dhalkebar line, to be built under the World Bank-supported Nepal-India Electricity Transmission and Trade Project, will have a capacity of 1,000 MW at 400 kV. It is expected that this project (due for completion in 2016) will be used to import electricity, at least during its first few years, thus increasing supply, and potentially helping to reduce variability of supply arising from seasonal variation in hydropower generation potential.

Even with the infrastructure in place, the lower cost of electricity generation in India is likely to limit the demand for imports from Nepal²⁰ as well as the attractiveness of investing in Nepal for Indian investors. The precarious financial situation of Indian state power utilities, combined with NEA's financial situation, also increases the risks for private investors.

3.5 Energy efficiency

According to those consulted, measures to improve energy efficiency in the industrial and commercial sectors have had limited uptake. Despite the potential for financial returns from investment in energy efficiency, the imperative to secure their supply of energy (electricity) has been the priority for companies. The Nepal Energy Efficiency Programme (NEEP) identifies the hotel, food and beverage, metal, cement, pulp and paper, cold storage, soap-making, chemical and brick-making industries as the most energy-intensive sectors²¹.

The potential for energy savings has been estimated as 15% in electricity consumption and 30% in thermal energy,²² valued at an estimated NPR 6,337 million.²³ These estimated energy savings would reduce CO₂e emissions by 507,247 tonnes a year: 62% from brick-making, 17% from cement and 11% from food industries. This is equivalent to about 15% of the country's total emissions of greenhouse gases.

Energy-efficiency measures have the potential to improve Nepal's competitiveness considerably. LICs tend to have higher energy intensity in production than developed countries, and thus their competitiveness will be more adversely affected by high and rising energy prices in future.

3.6 Investment climate

A priority for enhancing Nepal's international competitiveness is expansion of the country's electricity generation capacity. Private sector investment will be necessary for this, and has been part of the strategy for the sector since the 1990s. The Electricity Crisis Management Plan (2008) and the Immediate Action Plan on Economic Development and Prosperity (2012) both envisage investment by the private sector to achieve their objectives. Large-scale hydropower developments (i.e. schemes of hundreds or thousands of MW) will require foreign investment, commercial and concessional. For small hydro, however, there is scope for local investors, if the risks and returns are attractive enough.

²⁰ The cost of electricity in Nepal was estimated to be NPR 9.05/kWh, though only high consumers pay this amount. *Kathmandu Post*, 7 Dec 2012.

²¹ <http://weecs-need.gov.np/article-about>

²² These estimates echo those from a previous study under the Danida-supported Environment Sector Programme Support (ESPS) programme.

²³ www.weecs-need.gov.np/

There is no shortage of identified opportunities. Licenses for the construction of 57 new generation schemes and survey licenses for a further 392 have been awarded.²⁴ However, construction is not taking place at the rate required to quickly close the gap between electricity supply and demand. The four key interrelated reasons for this are

- bureaucratic delays, associated with poorly defined procedures and limited institutional capacity, including for example absence of an agreed format for Project Development Agreements (PDAs), and the negotiation of individual Power Purchase Agreements (PPAs)²⁵
- ill-defined mechanisms and procedures for incorporating local community interests and benefit sharing in grid-connected large hydropower schemes
- uncoordinated evolution of the responsibilities and remits of key institutions (NEA, AEPC), in the absence of an overall regulatory authority and clear Government direction (power sector reform has not gone as far as in many other countries to organisationally separate generation, transmission and distribution; and accountability mechanisms are weak)
- high risks for commercial investors, due to uncertainties from a combination of political and market factors.²⁶

These factors are connected to the political instability and weak governance that characterise assessments of the country's overall investment climate and international competitiveness. Institutional reform in the energy sector to take operational decision-making out of the political arena would be one means to improve things.

There is the potential for Clean Development Mechanism (CDM) benefits for LIC producers of renewable energy and energy-efficiency measures. However, carbon prices have been falling and are expected to remain low in the short to medium term. As a result, the carbon revenue from CDM projects in LICs will be lower than was expected when the projects were initiated, reducing the attractiveness of future investments in the short to medium term at least. The carbon price is generally predicted to rise over the long term (IPCC, 2007; UK Department of Energy & Climate Change (DECC), 2011), but the size and pace of that increase is unclear, as it will depend on the extent of international mitigation. Voluntary carbon markets are a more promising source of finance, and public climate finance also is likely to become increasingly available for investment in renewable energy generation, and may provide an important new source of funding for investment in LICs. The Clean Energy Development Bank is an example of this. Established in Nepal in 2006, the Bank has been receiving support and cooperation from a number of different donors.

3.7 Conclusion

Table 6 below summarises the main opportunities and risks that are currently faced in Nepal's energy sector, associated with the relevant drivers identified at the beginning of this report: natural resource scarcity, international mitigation policies and climate change. Possible policy and business responses are suggested, for further discussion and exploration.

²⁴ Registered applications for survey licences total 1,369 (see <http://www.doed.gov.np/>). However, the fees were recently increased, and many of these are expected to lapse.

²⁵ For schemes below 25 MW there is now a standardised PPA with set prices allowing for inflationary increases (currently NRs 8.4/kWh in the dry season and NRs. 4.8/kWh in the wet season). For larger schemes PPAs are negotiated case by case.

²⁶ Risks due to climate change did not appear to be a factor in the thinking of informants interviewed in February 2013.

Table 6: Summary of energy sector opportunities and risks associated with three drivers

Opportunities / threats	Implications / responses
Natural resource scarcity	
Poor access to electricity has undermined competitiveness; dependency on fossil fuel imports for industry and transport carries risk of fluctuating prices, which are projected to increase.	Investment in renewables and innovative ways to access electricity will improve competitiveness in the long term. Appropriate investment climate and regulatory framework needed.
Expanding the supply of electricity has been hampered by bureaucratic delays in licensing power generation schemes, associated with poorly defined procedures and limited institutional capacity.	Institutional reform in the energy sector to take operational decision-making out of the political arena. Establish an Electricity Regulatory Authority and reform NEA and AEPC. Strengthen Government capacity to negotiate and contract power purchase agreements with independent power producers.
Subsidies to LPG and diesel become increasingly unaffordable as international fossil fuel prices rise, and undermine long-term competitiveness	Remove subsidies and provide welfare support in other, more-efficient ways, while expanding access to other sources of fuel.
Potential to expand biogas production	Appropriate investment climate and regulatory framework needed for larger units (e.g. feed-in tariffs). Mechanisms to support access to finance to overcome upfront costs.
Potential for improved competitiveness from investment in industrial energy efficiency.	Need for energy-efficiency regulation, incentives, awards, demonstration projects, and access to finance to cover upfront costs.
International mitigation policies	
Potential to develop biofuels, including dual crops to overcome both food and energy security issues.	Investigation of costs of production and potential market for dual crops, which provide both food and biofuels. Need to balance competing demands for land.
Access to finance through carbon market could support investment in renewables and energy-efficiency measures. However, such finance may be limited in the short term, though public climate finance may be increasing.	Develop a strategy that optimises contribution from public sources of climate finance in the short term, and positions Nepal to access carbon markets in the longer term.
Impact of climate change	
Impact of climate change may reduce hydropower potential.	Diversify energy sources, and increase focus on small hydro, spreading the risk by having more dispersed sites for power generation.

The availability and reliability of energy, especially electricity, are major constraints on growth, competitiveness and living standards in Nepal. Yet the potential to develop hydropower and other renewable energy sources is substantial. Many opportunities for investment have been identified, but their development is hampered by a poor investment climate and weak institutional mechanisms and governance. At the same time, too much reliance on hydropower is unwise, given the impact of climate change on hydropower generation capacity, so a diversified energy mix is required, potentially through

the development of other technologies such as solar PV and wind energy. This would require the extension of incentives (e.g. feed-in tariffs, and investment support) to renewable energy.

Almost all of the fossil fuels used within Nepal are imported, and diesel and LPG are subsidised. Financial constraints hamper the ability of NOC to ensure supplies and to invest in distribution infrastructure to meet growing demand. Subsidising fuel also disincentivises renewable energy investment and energy-efficiency measures by companies, which can in turn undermine competitiveness in the long term. In addition, rising energy prices will make subsidising diesel and LPG less affordable over time, exacerbating public finance problems.

There are many economic opportunities that could be explored relating to possible new markets for biogas and biofuels. In addition, there is much scope to undertake energy-efficiency measures, which could significantly improve the competitiveness of Nepal's industries. Such measures have generated substantial savings in other LICs that have taken a more proactive approach to incentivising the private sector through energy audits and regulation.

Climate finance and carbon markets can potentially support investment in renewable energy and energy-efficiency measures in LICs. While some effort has been expended – by government, donors and businesses alike – in developing projects that incorporate finance from carbon markets (through CDM for example) into the business case, in practice this unfortunately now seems unlikely to yield much finance in the short term. Thus a shift in focus seems warranted, to support and incentivise the kinds of investments discussed here, which are linked to a wider business case based on energy prices. Given Nepal's current profile as a LIC with considerable potential for renewables development, the country should be well positioned to secure public climate finance to support these kinds of investments.

4 The forestry sector

It is estimated that around 40% of Nepal is currently forested,²⁷ and many households within Nepal live in or close to forest areas and are dependent on them for their livelihoods. Sources suggest that 11-18 million people are forest dependent within Nepal.²⁸ However, it is also estimated that Nepal lost its forest cover at the rate of 1.7% per annum during the period 1978/79 to 1994, according to the Food and Agriculture Organization of the United Nations (FAO).²⁹ The rate of forest and shrub depletion was 0.5% per annum during the same period. (The national forest inventory has not been updated since then, so more recent data on forest cover is unavailable.) As in other countries, the forests in Nepal inevitably compete with other land uses (Ministry of Forest and Soil Conservation (MoFSC), 2009). Forests in the hills have been cleared primarily for agricultural activities, while those in the terai (low lying land) have long been used for agriculture, settlement and infrastructure development, and continue to suffer from illegal logging.

Some of these processes are part and parcel of development, and some degree of forest exploitation is inevitable and indeed desirable in a growing economy. However, much of this activity is unsustainable, such as illegal logging. While lucrative in the short term, this results in depletion of natural assets and land degradation, with many land areas previously covered by forests becoming barren, which undermines growth in the long term. Livelihoods based on more-sustainable harvesting of forest products, including both timber and non-timber products, will be jeopardised by these unsustainable uses of the forest.

Over time, various policy measures have been put in place to try and manage the forest more sustainably. One of these is the community forestry programme, which has had quite a degree of success. Giving control to forest user groups, whose ongoing livelihoods depend on the forest, creates incentives for sustainable forest management by the community itself. This model has worked particularly well in the mid-hills region, though less so in the terai, where better road links make illegal logging easier and more lucrative.

One part of the solution to unsustainable forest use is appropriate legal control and better enforcement of existing laws and regulations. But another part is creating a stronger incentive to protect the forest, by facilitating the development of alternative livelihoods that are consistent with forest conservation, including ecotourism, sustainable harvesting of timber or fuel wood, and the sustainable harvesting and sale of non-timber forest products (NTFPs) such as medicinal and aromatic plants, paper and paper products, furniture and handicrafts. In addition, when more fully developed, carbon market mechanisms such as REDD+ promise to remunerate better forest management; thus, forests can be seen as an asset that could increase in value over time.

4.1 Forest management regimes in Nepal

Policy measures to protect the forests date back to 1957, when all the forests in Nepal were nationalised with the primary objective of their protection. However, deforestation continued unabated. The realisation that forest protection was not possible without the buy-in of the population paved the way for community participation in forestry sector management.

²⁷<http://dof.gov.np/about-us/functions-of-dof>

²⁸http://www.dfid.gov.uk/r4d/PDF/Outputs/Forestry/ZF0163_-_forest_dependent_people_Nepal.pdf

²⁹http://www.forestrynepal.org/images/publications/fra_2010_nepal.pdf

The Forestry Sector Master Plan of 1988, which was drawn up for a period of 25 years, envisioned the handing-over of all the accessible hill forests to community forest user groups (CFUGs) – comprising poor men and women living in the area - with a priority to supply forest products to those who depended on them. In the early 1990s a number of forestry sector policies and legislations were enacted in the spirit of the Forestry Master Plan. With the enactment of the Forest Act 1993 and Forest Regulation 1995, the management of national forests was assigned to a number of different entities, resulting in multiple forest management regimes as outlined below.

Table 7: Different forest management regimes

National forest	All, excluding private forests, whether marked or unmarked with forest boundary, including waste or uncultivated lands or unregistered lands surrounded by the forest or situated near the adjoining forest, as well as paths, ponds, lakes, rivers or streams, and riverine lands within the forest, come under the purview of national forest.
Government-managed forest	A national forest to be managed by the government.
Protected forest	A national forest declared as a protected forest as a result of special environmental, scientific or cultural importance.
Community forest	A national forest handed over to user groups for its development, conservation, utilisation and management. The user groups also sell and distribute the forest products independently by fixing their prices according to the work plan.
Leasehold forest	A national forest handed over to any institution or industry based on forest products or community. Leasehold forest groups manage the forest according to the approved operational plan with complete rights over the products. Only degraded lands can be leased out, for a period of up to 40 years.
Religious forest	A national forest handed over to any religious body, group or community for its development, conservation and utilisation.
Private forest	A forest in any private land owned by an individual pursuant to prevailing laws.
Collaborative forest	A national forest in the terai that is designed with the active participation of central government, local government and local forest users. The Ministry of Forests and Soil Conservation (MoFSC) has approved an operational guideline to legally hand over a forest as a collaborative forest. Nine large forest blocks had been allocated as collaborative forests as of April 2011, under this relatively new mechanism (Dangal and Roy, 2011).
Buffer-zone forest	A national forest in the buffer zone of 11 protected areas – that include national parks, wildlife reserves, hunting reserves, conservation areas and buffer zones – run by the buffer-zone community forest users’ groups. Such groups have the right to access all the forest products for their subsistence use. A total of 542,267 ha. of forest have been handed over to the buffer-zone communities, benefiting 115,447 households (Department of National Parks and Wildlife Conservation (DNPWC), 2009 cited in Dangal and Roy, 2011).
Proposed community forest	A national forest in the terai and inner-terai that is being protected as proposed community forest without any legally binding document. Such forests are run according to the district forest management plan. With a highly limited right over forest use, community forest users have access to forest products sufficient only to meet their subsistence needs.

Table 8 below illustrates the total area of forests and shrublands being managed under the various regimes.

Table 8: Forest and shrublands under different institutional regimes

	Community forests	Leasehold forests	Collaborative forests	Forests under protected areas	Government forests or residual forests	Total
Total area in ha.	1,350,873	23,534	10,936	887,000	3,555,967	5,828,310
Percent	23.18	0.4	0.19	15.22	61.01	100

Source: Poudyal (2009), community forest data from DoF (up to 15 April 2011) cited in Dangal and Roy, 2011.

4.2 Community forestry programme – a success story?

Community forestry has been seen as a success story in promoting sustainable use of forests in Nepal. According to the Community Forestry Division (CFD) at the Department of Forests (DoF),³⁰ a total of 18,133 CFUGs, covering an area of 1,700,048 ha. (11.55% of the total area of the country) had been established as of August 2013. This covers 2,237,195 households in 74 of the 75 districts in Nepal, or 41.22% of the total households (5,427,302) in Nepal.

Forests are an integral component of livelihoods in Nepal. The Livelihoods and Forestry Programme (LFP) (2009a) (a DFID funded project designed to promote more equitable, efficient, and sustainable use of forest and other natural resources), cited in Bhattarai (2011), showed that the community forests (CFs) contributed about 25.4% to increased incomes of the households under the LFP.³¹ The time saved in gathering essential products from the forest, and the income-generating activities run under the LFP, were the major factors that contributed to this income growth. The Multi Stakeholder Forestry Program (MSFP) (a new programme designed to promote sustainable forest livelihoods, discussed below), also cited in Bhattarai (2011), reports the direct benefits of community forestry in the form of extraction of timber, fuel wood, fodder, grass and leaf; while indirect benefits come in the form of higher carbon sequestration, soil stabilisation, reduced flood risks and improved biodiversity, among other things.

Several studies have reported the success of community forestry in controlling deforestation and degradation in Nepal. Branney and Yadav (1998), cited in MoFSC (2009), report an increase of 29% basal area for degraded CFs in four years.³² Similarly, according to LFP (2009a), in 14 years there was a 21% increase in biomass across CFs of all types and conditions. In the case of protected areas, the participatory management of buffer zones has been relatively successful compared with a strict protection system. Moreover, the success of community forestry is reflected in the overall improvement of forest conditions, social mobilisation, poverty reduction, institutional development and creation of rural employment (Dangal and Roy, 2011). The sense of ownership of forests among the local people is also seen as a testament to the success of the community forestry programme in Nepal. A recent study reviewing the thirty years of community forestry in Nepal, commissioned by the MoFSC, applauds community forestry and participatory area management for their path-breaking achievements since the 1980s, which, according to the study, are globally recognised as best practice models (MoFSC, 2013).

Despite the success of community forestry however, government directives have been curtailing the rights of the communities, and have effectively halted the CFs handover processes (Dangal and Roy 2011). Moreover, the environmental guidelines enforced since 2005 make it mandatory to do an initial environmental examination (IEE) for areas over 200 ha., and an environmental impact assessment (EIA) for areas over 500 ha., before handing them over to the communities. Such

³⁰<http://dof.gov.np/wp-content/uploads/2013/07/Summary%20of%20Community%20Forest%20Data.pdf> (accessed 15 August 2013)

³¹<http://www.forestrynepal.org/project/40>(accessed 28 March 2013)

³²<http://www.dnr.state.mn.us/forestry/subsection/glossary.html>(accessed 28 March 2013)

provisions have increased administrative procedures and costs of forest handover, and there has been a sharp decline in the handover of forests as CFs since 2005. At the same time, it is reported there have been cases where the communities have been given less than 200 ha. of forests to manage as CFs to avoid the IEE, while they actually manage more than 200 ha. (ibid).

The district forest office (DFO) staff – assigned with the major tasks of facilitating the formation of groups, developing and revising plans, providing technical support in the implementation of plans and regular monitoring – have allegedly been found involved in activities that are against the law. For example, they are reported to have overridden the provisions in forest acts and rules by encouraging or supporting felling and transportation of forest products. Similarly, the provisions for sharing revenue earned from the sale of timber between the government and the CFUGs in the terai is not welcomed by the latter. In order to avoid the 13% value added tax (VAT) on the sale of surplus timber of two commercial species in the terai as provisioned by the amended Finance Act of 2005, CFUGs allegedly hide some logging activities, and thus cut more trees than approved under the forest management plan. Therefore, there are proponents who call for leaving the sale of forest products to the market with minimal government intervention or taxation, and also for revising the benefit-sharing provisions between the government and the CFs – such as the VAT that the CFs have to pay for the trees with high commercial value – and within the CFs themselves. Some thus argue there is a need to hand over the forests to private entities for commercial purposes, while putting the conservation of forests at the core of any such activity (ibid).

It is also reported that the current benefit-sharing practices of most of the CFUGs in the terai do not address the needs of the users who reside far from the forests. These people have been adversely affecting the forests in the terai by using them as open access resources without due concern for the sustainability of their actions, as they do not own the forests. Thus, community forestry initiatives in the terai have been considerably less successful than in other areas (Ibid). This suggests there is a need to make such users the custodians of the forest through innovative approaches, perhaps through collaborative forestry mechanisms (as defined in Table 7 above).

The political economy within the CF sector is such that the institutional set-up of the CFUGs themselves has made them weak and appears in some cases to have provided a conducive environment for the misappropriation of forest resources and revenues. Although the CFUGs are inclusive entities, a few people still hold the power, and they have often been reported to have obtained personal benefits through means that are damaging to the forests. It is also possible that the potential for personal gain explains the observed growing competition to be elected to the CFUG executive committee. There are also reports of CFUGs failing to incorporate socially and economically deprived groups (MoFSC, 2013), who, in turn, impact the forest adversely through their efforts to gain access to the forest products – which are resources essential for their survival – at any cost. There are reports of almost 50% of the CFUGs not carrying out annual audits through a certified auditor, which raises concerns about the possible misuse of funds (Dangal & Roy, 2011). Thus, there is a need to improve transparency within the system, if the CFUGs are to function effectively as the custodians of forest protection.

4.3 Current status of deforestation and forest degradation

Deforestation (described by the FAO as the conversion of forest to another land use or the long-term reduction of the tree canopy cover below the minimum 10% threshold³³) and forest degradation (a reduction of canopy cover or stocking within the forest, and changes within the forest that negatively affect the structure or function of the stand or site and thereby lower the capacity to supply products and/or services³⁴) have been reduced as a result of the community-based forestry programme, as discussed above. The infrastructure development – especially rural roads – still causes forest loss in the mid-hills, and the terai areas have continued to suffer deforestation and degradation due to encroachment onto forests for settlement, infrastructure development, agricultural activities and illegal

³³ See FAO (2001) for detailed definition, <http://www.fao.org/docrep/009/j9345e/j9345e07.htm> (accessed 15 August 2013)

³⁴ See FAO (2001,2006) for detailed definition, <http://www.fao.org/docrep/009/j9345e/j9345e08.htm> (accessed 15 August 2013)

logging. These forests also suffer from recurrent fire and unregulated grazing that retard their regeneration and growth.

MoFSC (2009) identifies nine major reasons for ongoing deforestation and forest degradation in Nepal. They are as follows: high dependence on forest and forest products (timber, firewood and other NTFPs); illegal harvesting of forest products; unsustainable harvesting practices; forest fire; encroachment; overgrazing; infrastructure development; resettlement; and expansion of invasive plant species. In the terai and Siwalik regions of Nepal, major reasons given are inappropriate and inadequate policies to govern the forestry sector, coupled with the inefficient bureaucracy that results in lax law enforcement. At the same time, there is high demand for timber and firewood, both in the country and across the open border, which incentivises illegal logging.

High population pressure in the terai has resulted in encroachment of settlements onto forest areas. Moreover, the opportunity cost of retaining forest areas in the terai is high due to the productive land and the high price of timber that the forests in the terai yield. According to one informant in the Mahottari district in eastern Nepal, selling a tree can buy a self-loading rifle, the implication being that trees are worth a great deal, and that smugglers have better weapons than the forest guards. The current state of political instability, lawlessness and insecurity, coupled with poverty and the lack of alternative livelihoods, have provided a fertile ground for illegal logging to go unchecked.

There is very little information about forests in the mountainous region due to the harsh topography. The media frequently report illegal export of timber to Tibet. Acharya (2003), cited in Dangal and Roy (2011), reported that forest degradation has exceeded deforestation due to the excessive use of timber for house or hut construction, fuel wood consumption and smuggling of timber to Tibet, as well as for livestock fodder. Forests in the mountains also suffer from recurring fire, which is deliberately lit to stimulate the growth of grass for yak and sheep (Dangal and Roy, 2011).

Problems of coordination in policy-making, planning and implementation among various ministries and departments have also been seen as the cause for accelerated deforestation and forest degradation. Weak coordination is particularly evident in infrastructure development programmes (MoFSC, 2009). The negative impacts of unplanned rural road construction, and extraction of raw materials from forest areas, especially sand, gravel and stone, are highly visible. There are conflicts over jurisdiction and authority over forests in various parts of the legislation. Coordination is needed in order to balance the objectives of forest conservation with the development of infrastructure such as power stations and roads that are vital for national development.

Against this backdrop, Nepal's forestry sector needs multi-stakeholder involvement in solving the various problems. For example, as MoFSC (2009) suggests, it is necessary to sensitise the political parties, enhance forest law enforcement and governance, create a conducive environment for alternative income generation activities for poor people, and devise policies to attract private sector investment in the forestry sector.

4.4 Medicinal and aromatic plants

Medicinal and aromatic plants (MAPs) was one of the 19 categories of goods and services identified as having considerable export potential for Nepal in the Nepal Trade Integration Strategy (NTIS) 2010. Given the abundance of endemic species, Nepal possesses the unique advantage of being home to a number of important MAPs. Along with other products, such as essential oils and handmade paper, these NTFPs represent potentially lucrative alternative livelihoods from forests. The development of this sector could therefore improve the incentives for sustainable forest management, in order to protect these livelihoods in the long term.

A recent UNEP study (UNEP, 2012) also confirms the potential to develop the sector to generate livelihoods and contribute towards achieving a green economy. However, the paper notes that the harvesting of MAPs is currently unregulated, and in the absence of appropriate forest management, there is a risk that these plants, which mostly grow wild, could be harvested unsustainably given the economic benefits they provide in the short run. Indeed, they could suffer the fate of *Yarsagumba*

(*Ophiocordyceps sinensis*), a highly expensive fungus known for its aphrodisiac uses, found in the meadows of the Himalayas at 3,000-5,000m where the locals, and a few others, collect and sell them almost unchecked. This has led to concerns about their significant decline in Nepal. Some are also of the view that the declining supply of *Yarsagumba* could shift the pressure to the endangered medicinal plants and forest products in the mountain forests³⁵.

However, given sustainable management of the production of MAPs, both the existing industry and the government believe there is significant potential to increase Nepal's exports, especially in light of growing international demand for MAPs products. So far, exports have mainly been to India, but there seems to be a significant potential to sell to other markets. Based on the four predetermined criteria of market size, import growth in the importing country market, ad valorem tariff imposed, and margin of preference vis-a-vis the five top exporting countries, the NTIS (2010) has identified the top 10 most attractive national markets for the export of medicinal herbs, and the top 10 for the export of essential oils.

Table 9: Exports of MAPs and essential oils from Nepal to the world (US\$ '000)

Product	2009	2010	2011
Medicinal and aromatic plants	9,794	6,178	11,839
Essential oils	711	505	1,279

Source: Trade Map online database.

Subedi (2006), cited in Kunwar *et al.* (2009), reports over 161 plant species being harvested for commercial use in Nepal, with the engagement of at least 137 entrepreneurs and about 71 community-based enterprises. Our own study gathered information from private companies in Nepal that procure MAPs and other NTFPs and process them into various products like essential oils and handmade paper. Most of the companies work with CFUGs to grow the necessary products. They provide inputs such as saplings to the CFUGs, provide training on how to grow them, and check for quality from plantation to harvesting. These companies then buy back the products once they are harvested. The price that the companies pay to the CFUGs depends on the quality of the products. This is corroborated by the Federation of Community Forestry Users, Nepal (FECOFUN), although they also expressed concerns that the market for these products is volatile, and that they are not provided with enough training to grow, harvest and produce quality products.

Nepal also imports expensive finished goods from India that are made out of the raw materials exported from Nepal. Indeed, according to estimates provided by one company, only 20-25% of the herbal products in Nepal are domestically produced, with the rest coming from India. This is symptomatic of the wider challenges associated with developing manufacturing sectors that add value through processing and packaging, as opposed to the export of raw materials for relatively low return, where value addition is undertaken elsewhere. Industry players said there was a lack of proper plans and policies to promote Nepali herbal products and to develop the sector.

Despite the optimism about the sector, Kunwar *et al.* (2009) is critical about the role of NTFPs enterprises as one of the potential means to reduce poverty as envisioned by the government. According to Kunwar *et al.*, so far only a limited number of NTFPs enterprises have been successful in creating income and employment for the poor. According to Sharma and Shrestha (2011), despite the annual growth of trade in MAPs and essential oils at the international level, Nepal's share in the trade is very small. This reflects a number of important challenges in developing the industry.

³⁵ <http://m.scidev.net/en/south-asia/news/-himalayan-viagra-harvesters-threaten-forest-resources.html>

Lack of regulation, standards and certification

Nepal does not have clear standards for the sustainable use of forest products. There may be a need to set national standards that are in line with decisions about the envisaged specialisation and prioritisation of certain products to be developed for export. These should also be linked to the forest inventory guidelines for the forests in the terai (which require user groups to ensure the sustainable use of forest resources through the production of a forest management plan that has to be approved by the government and renewed every five years). Regular inventories of MAPs resources could also be carried out to monitor the impact of growth in the sector on the availability of the raw materials.

Since many international markets demand certification, this is an important – indeed, increasingly essential – marketing tool for business. In the case of MAPs and essential oils, which are used in manufacturing medicines, food supplements and other products for human consumption, ensuring and maintaining the quality and standard of products is very important. However, Nepal has been grappling with some of the requirements. For example, sometimes importing countries demand data on pests associated with a particular product. However, Nepal does not have basic pest data for listed medicinal plants; thus, exporters first send samples of products for quality inspection to the importers, and only after they receive the go-ahead from importers can they export their products (Sharma and Shrestha, 2011). There are also issues around sanitary and phytosanitary (SPS) certification, good manufacturing practice (GMP) standards and the requirement to fulfil a set of good agricultural practices applicable to the production of MAPs as devised by the European Herb Growers Association, that must be complied with for exporting to the European market in particular (ibid). The standards vary between countries. European companies usually import only from certified Nepalese companies, while Asian companies tend to be less concerned about standards and certification. However, certification can generate a price premium, even in markets that do not require certification.

Capacity-building to enable producers to meet SPS and other requirements of importing countries is needed. FECOFUN has been helping some CFUGs to get Forest Stewardship Council (FSC) certification, although only 21 have obtained it, according to one source.³⁶ The process is costly, given the need to keep records of the production cycle of the plants and trees – from plantation to harvesting – and CFUG members are not well equipped to meet these requirements. The appointment of an auditor for proper bookkeeping is also costly, and it consumes resources and time to gather information, organise focus group discussions, and undertake the many other activities that are prerequisites for certification. The institutional and financial arrangements for all these processes represent considerable effort for CFUGs that consist of only small groups of people.

Laboratory testing

Laboratory testing of products is an important part of the certification process. However, existing laboratories in Nepal are reported to suffer from poor equipment and facilities, and a lack of electricity and human resources. This means it can take several weeks to obtain a report, creating delays that hamper exports. When large quantities of a product are produced in different batches, and the importing firm abroad asks for a report for each separate batch, this can be almost impossible to obtain.

Branding

A need for national branding of Nepalese forest products, along with market research and marketing of domestic products, was highlighted by firms in the industry. Reportedly, many Indian firms sell their products to foreign companies labelling them as made in Nepal. At the same time, many Nepalese companies cannot export their products due to a lack of branding and market recognition, amongst other things.

Inadequate labour supply

A labour shortage is reported in the hills and high altitude districts due to labour migration to cities and out of Nepal. This has resulted in high labour costs in these areas. It is exacerbated by the fact that, due to a lack of information on market demand and prices, collectors of MAPs in Nepal receive less than

³⁶In Nepal, only 21 CFUGs of Dolakha and Bajhang with 14,000 ha. area and 34,000 households have obtained an FSC certificate of sustainable forest management. See Forest Certification National Working Group of Nepal, http://nfa.org.np/wp-content/uploads/2010/10/brochure_project.pdf (accessed 14 March 2013).

they should for the product they sell, and thus incentives to supply this market are limited (UNEP, 2012).

Some farms in the terai region, according to one of the private companies we interviewed, have started mechanising the production process, mainly the tilling and harvesting processes. Such mechanised production may help the big firms achieve economies of scale through mass production, and overcome labour shortages. However, such mechanisation is not feasible in all parts of the country due to more-challenging topography.

Government support and incentives

UNEP (2012) notes that the lack of policy support and investment in improving the quality of Nepali MAPs makes them less competitive in international markets. In addition, higher import duties levied by India on processed products also discourages value addition in Nepal.

Interviewees highlighted various policies that could help to promote the MAPs industry, including government incentives such as tax rebates to MAPs producers and exporters, the establishment of advanced processing zones, and the development of institutional arrangements to support the necessary research and development. Government could also provide support for research leading to the identification of varieties suitable for cultivation, and a network could be established to link research, regulatory and development agencies, and businesses to share information and to discuss challenges in the sector, and solutions (UNEP, 2012). It is also argued that the government should do more to tackle the various non-tariff barriers imposed by trading partners, especially those imposed by the various Indian states.

The impact of climate change

A report by LFP (2009b) assesses the nature and type of climate change impacts on forests and forest-dependent people in Nepal. According to the report, Nepal has seen reduced rainfall and water supply, movement of certain plant species to higher elevations in response to temperature increases, and increased incidence of disease in crops and livestock. The forests in the mountain region are expected to be the most vulnerable to climate change as the rise in temperature brings more changes in precipitation, which is expected to contribute to an increase in drought-resistant trees or grasslands that will replace existing forest ecosystems. In addition, some CFUGs are reportedly suffering from water shortages.³⁷

Although most of the MAPs companies consulted during the research stated that they had not experienced any significant impact on their business due to climate change, some noted that the irregular rainfall pattern has been hampering their yields. In addition, some suggested that the problems seen in the growth and quality of a few herbs – for example, plants flowering earlier than normal – might be due to the changing climatic patterns, although over-harvesting is also blamed for the poor performance of some plants.

One of the interviewees mentioned that the pre-monsoon in 2012 hampered harvesting, transportation and subsequent processing and production of MAPs. It was also mentioned that the habitat of some plants is shifting upwards to highland areas. For example, Spikenard (*Nardostachys jatamansi*), commonly called Jatamansi, an important medicinal plant that 12 years ago could readily be found at an altitude of 3,500m, is reportedly now found only above 3,800m. Scarcity of water for irrigation and processing has also been mentioned by the interviewees as a major constraint. Poor water quality has been found to reduce the quality of handmade paper – another NTFP – due to the presence of substances like silica and iron in the water. Thus, it seems that a more in-depth study of the potential impact of climate change on this sector, and analysis of appropriate risk mitigation strategies, may be warranted.

³⁷See for example <http://www.thehindu.com/news/national/forest-communities-in-nepal-grappling-with-climate-change/article2048658.ece> (accessed 11 September 2013)

Political instability

As in many other sectors, political instability has been detrimental for the MAPs sector. The decade-long insurgency broke the linkages between the companies and the farmers as the latter stopped cultivating MAPs because of the conflict. The companies stated that they have been gradually building up the linkages again.

4.5 Tourism

Nepal has considerable potential to offer ecotourism packages based around wildlife watching and homestays in the forests in protected areas. Currently, the buffer-zone forests in the protected areas scattered across the country are major tourist destinations, attracting more than 50 % of the total foreign tourists in Nepal (MOPE, 2004). This has the potential to provide alternative livelihoods that are reliant on forest conservation, and thus create stronger incentives to protect the forest.

However, there are also some concerns about the impact of tourism on forest areas. For example, the construction of infrastructure like access roads, bridges and watchtowers – which are often important to open the country up to economic development including tourism – has been jeopardising the pristine nature of the forest, which in turn undermines some forest assets. Thus, infrastructure development for tourism services within forests must be undertaken with due consideration to the environmental impacts in order to ensure further tourism development is sustainable. Although this is not always easy to do, the need has been recognised. In 2012, the Government removed seven hotels leased inside the Chitwan National Park, on the recommendation of the parliamentary Natural Resources Committee, in order to protect wildlife and trees.

These issues are discussed further in the tourism section below.

4.6 Climate finance in the forestry sector

There is potential for a developing country such as Nepal to tap the financial and technical benefits emerging from carbon market mechanisms including those established under REDD+ (Reducing Emissions from Deforestation and Forest Degradation). While the Government of Nepal has been partnering with various organisations to design the modalities of REDD+ implementation in order to prepare the country to benefit from REDD+, as mentioned in Table 10 below, others argue that progress has been slow.

Table 10: Summary of the REDD+ piloting projects

Projects	Focuses
Design and establishment of a governance and payment system for community forest management under REDD+	Developing methodologies for REDD+ plus
REDD+: Reducing Poverty in Nepal	Developing methodologies for REDD+ plus
Plan Vivo	Developing methodologies for REDD+ plus
Grass roots level capacity-building on REDD+ in Asia and the Pacific	Awareness and capacity-building
Climate change and partnership programme	Awareness and capacity-building

Source: MoFSC (2011)

Some local and international non-governmental organisations have been piloting the modalities of REDD implementation in Nepal. The Asia Network for Sustainable Agriculture and Bioresources (ANSAB), the International Centre for Integrated Mountain Development (ICIMOD) and FECOFUN have been implementing a pilot project to design governance and payment systems for Nepal's CF management within the REDD mechanism. The project is being implemented in three watershed areas with financial support from the Norwegian Agency for Development Cooperation (NORAD). The project specifically aims to gauge the feasibility of a payment mechanism under REDD that would potentially provide additional economic benefits from the forest to locals involved in CFUGs, along with carbon financing as an incentive to reduce deforestation and forest degradation and to promote more-sustainable use of forests.³⁸

The project is aiming to institutionalise a forest carbon trust fund (FCTF) at the grassroots level using a seed grant of US\$100,000 from NORAD. A taskforce distributed a total of US\$95,000 up to June 2012 in the three project areas based on three criteria: the quantity of forest carbon saved above the baseline established by the project, the number of indigenous and minority group households, and the female population and number of poor households in the area.

The fund is reported to have been distributed among CFUG members, who have been using it for purposes such as alternative energy promotion, conservation of forest carbon stocks, sustainable management of forest, biodiversity conservation, poverty reduction and livelihood improvement, awareness raising and capacity-building on REDD and climate change, and the auditing of FCTF and verification of data.³⁹

Unfortunately, progress towards developing carbon finance through REDD+ has been very slow at the international level, and it is not clear how or how quickly the mechanism will develop going forward. So although government, international donors, NGOs and private sector entities have been considering how to build REDD funding into the business case for various forestry related projects, this now seems unlikely to yield much finance in the short term. Thus, while positioning the country to benefit from REDD+ makes sense, too much reliance should not be placed on this as a funding mechanism.

A shift in focus seems warranted, to identify and support the development of market opportunities that do not rely on carbon markets to create alternative, sustainable, forest-based livelihoods and that by themselves can increase the economic value associated with forest conservation and sustainable forest management. In addition, as public sources of climate finance are perhaps more likely to be forthcoming (than finance through carbon markets) for LICs such as Nepal, the most appropriate way forward may be to develop strategies to capitalise on these sorts of finance in ways that build competitive markets in sectors that are consistent with forestry conservation.

An example of this is provided by the MSFP, which was set up in 2011.⁴⁰ This initiative, started by the MoFSC with support from the Finnish, Swiss and United Kingdom governments, aims to promote community-based forest management and forest-based livelihoods and income generation, including by promoting investment by the private sector in forest business partnerships.

4.7 The potential for private management of forest resources

One option that has not yet been explored much within Nepal is management of forest by private enterprises. As with community groups, giving a private entity rights over forest products for a reasonably long period (or ownership of the forested land as an asset) could in principle create incentives for sustainable forest management, as degrading the forest would reduce the value of the asset. Given the strength of incentives for short-term gain through logging and forest clearance, this solution would doubtless require a strong regulatory framework governing permitted use of the forest

³⁸ Interview with ANSAB officials, 6 February 2013, Kathmandu and the website <http://www.ansab.org/publication/himalayan-bioresources-volume-3-issue-3/>.

³⁹ Interview with ANSAB officials 6 February 2013, Kathmandu and website <http://www.ansab.org/publication/himalayan-bioresources-volume-3-issue-3/>.

⁴⁰ <http://www.msfp.org.np/>

by the private entity, and could well run into the kinds of problems already observed within Nepal, around poor capacity to manage the forest on a sustainable basis, weak enforcement, and the risk of corruption that permits unsustainable exploitation of forest resources. Indeed, in many instances, large private actors have been responsible for the worst governance failings within the forest sector.

On the other hand, management by private entities might have advantages over management by CFUGs: having ownership concentrated in the hands of one entity might strengthen governance – as all community groups have competing interests within them, which makes managing difficult – and private entities might have more resources that make them better able to monitor activities within the forest and enforce the regulations governing usage. Such entities can potentially identify and develop alternative sustainable livelihoods that can be created out of these forest resources, e.g. by exploring, identifying and tapping into growing national and international markets. Since there is a research gap in this area, an assessment of the potentials – both opportunities and challenges – of this kind of private sector forest management in Nepal could be a useful exercise.

Another possible management model is one in which private firms who use firewood for their own energy needs buy up areas of forest and manage them in a sustainable way in order to provide an ongoing source of fuel wood and thus reduce their own vulnerability to rising and fluctuating energy prices. The feasibility of this would depend on the extent of dependence on fuel wood by industry within Nepal, and price trends in alternative energy sources.

The Immediate Action Plan on Economic Development and Prosperity (2012) states that the forestry sector will be developed commercially in order to increase the contribution of forest products to GDP, through the increased implementation of leasehold forestry – which currently only accounts for a very small proportion of forest area in Nepal. Such a policy could potentially generate sustainable economic gains, if it is implemented effectively, with long-term sustainability considerations in mind, and if the resulting commercial activities are regulated carefully.

4.8 Conclusion

Table 11 below summarises the main opportunities and risks that are currently faced in Nepal's forestry sector, associated with the relevant drivers identified at the beginning of this report: natural resource scarcity, climate change and international mitigation policies. Possible policy and business responses are suggested, for further discussion and exploration.

Table 11: Summary of forestry sector opportunities and risks associated with three drivers

Opportunities / risks	Implications / responses
Natural resource scarcity	
Illegal logging and clearance for competing land use, incl. agriculture, settlement, and infrastructure development, deplete Nepal's natural assets and threaten forest-dependent livelihoods in the long term.	Multi-stakeholder processes to develop a joined up strategy for forestry management that balances competing national development priorities.
Demand for timber, firewood and raw materials for infrastructure development, which in turn impact wider domestic competitiveness of other industries.	Identification of alternative sources of energy and other raw materials, and better management of their extraction.
Weak forest governance due to lack of capacity, corruption, weak enforcement, poor inter-ministerial coordination.	Improved monitoring and enforcement. Forest management models that create incentives for self-monitoring and enforcement of sustainable forestry use such as community forest management.
Community forest management has helped encourage sustainable forest management, but also faces challenges.	Scaled up community forest management and reform to reduce perverse incentives.
Potential for private sector management of forest to commercialise the sector further, under an appropriate regulatory framework to ensure sustainability.	Exploration of the economic and political feasibility of this model of forest management, perhaps through the implementation of leasehold forestry.
Identification of livelihoods from sustainable forest use e.g. ecotourism, NTFPs such as MAPs.	Public-private dialogue to devise a strategy to develop the sustainability, competitiveness and socioeconomic benefits of these sectors.
International mitigation policies	
Forestry Stewardship Council certification can improve access to markets and generate a price premium, but is also difficult to achieve.	Support more community forest user groups to obtain certification.
Climate finance from public sources, or potentially through REDD+ in the longer term.	Develop a strategy that optimises contribution from public sources of climate finance, but does not rely on REDD+ in the short term.
Impact of climate change	
Reduced rainfall and water supply, changes in distribution of plants, changes to yields of particular crops, and increased incidence of disease could threaten certain forest-dependent livelihoods.	More in-depth study of impacts on particular livelihoods, awareness raising activities, and appropriate risk mitigation strategies.

Deforestation and exploitation of forests can yield high economic gains in the short term, but if undertaken in an unsustainable manner can undermine long-term growth and competitiveness by jeopardising forest-dependent livelihoods, depleting natural assets, and causing soil erosion that leaves large tracts of land barren. Given the high proportion of Nepal's population who are dependent on forest, managing it appropriately in order to secure sustainable livelihoods will be crucial to achieving inclusive and sustainable growth.

The introduction of community forestry management has successfully reduced deforestation and yielded economic benefits for participating communities. However, the model is facing some

implementation challenges, and further reforms could potentially help to improve its impact. Exploitation of Nepal's forests still continues in an uncontrolled fashion in many areas. The forests in Nepal inevitably compete with other land uses, including agricultural production, settlement and infrastructure development. Logging continues in light of lucrative domestic and export markets for both timber and fuel wood. Some of these processes are part and parcel of development, and some degree of forest exploitation is inevitable and indeed desirable in a growing economy. Infrastructure development and firewood availability are important for the wider competitiveness of the national economy. However, it is clear that a balance needs to be struck between competing national development priorities. Multi-stakeholder processes to develop a more joined up strategy for forestry management could help to achieve this.

One part of the solution to unsustainable forest use is appropriate forest management at the national level, and better enforcement of existing laws and regulations. But another part is creating stronger economic incentives to protect the forest, by facilitating the development of alternative livelihoods that are consistent with forest conservation. CFUGs are one way to achieve this, as they have relatively strong incentives to identify and develop livelihoods based on sustainable forest use. Private management of forest resources, along with an appropriate incentive mechanism and regulatory framework, could also provide a possible model for more sustainable forest management that would potentially help to commercialise the forest sector further, perhaps through the careful implementation of leasehold forestry as set out in the Immediate Action Plan on Economic Development and Prosperity (2012).

Forest-dependent livelihoods can be based on sustainable harvesting of timber or fuel wood, and the sustainable harvesting and sale of NTFPs, particularly those in which Nepal has a significant competitive advantage, such as MAPs. There appears to be considerable scope to develop these markets further and to develop Nepal's export competitiveness and manufacturing base on the back of these products in a way that also contributes to sustainable forest management. However, there are many challenges to be overcome relating to standards and certification, marketing and branding, labour supply, and investment climate, etc. Thus, some form of public-private dialogue to devise a strategy to strengthen the sustainability, competitiveness and added value of the sector could help to prioritise government and donor support for the necessary reforms and the development of appropriate market institutions.

In addition, when more fully developed, carbon market mechanisms such as REDD+ promise to remunerate forest conservation and could be used to develop these kinds of livelihoods. Thus, Nepal's forests should be seen as an asset that could increase in value over time. However, given the slow rate of international progress on REDD+, it seems safer to base forest development and conservation strategies on contributions from public sources of climate finance in the short term, rather than on carbon markets.

5 The tourism sector

Tourism is a high-growth sector, representing a significant opportunity for Nepal. It creates jobs directly, as well as many indirect livelihood opportunities down the supply chain, e.g. supplying hotels with food. However, it also creates challenges, relating for example to natural resource management – where growing tourism demand competes with other uses of energy and water, which may already be in short supply. Tourism can also generate large volumes of waste and rubbish that pollute the local area, and infrastructure development – though important, as better transportation also benefits tourism growth – can erode natural assets such as forests.

These issues need to be managed well, if Nepal is to continue to compete successfully with alternative tourism destinations. Growth of the tourism industry can itself be jeopardised by poor natural resource management, for example where pollution reduces the value of tourism-related assets such as mountain environments, or where deforestation threatens biodiversity, water resources, and the beauty of the landscape. Thus the tourism industry has an interest in developing a sustainable and environmentally conscious sector and protecting the natural environment, and can act as an important advocate of green growth policies.

Ecotourism – as a specific subset of the tourism industry, defined as ‘responsible travel to natural areas that conserves the environment and improves the well-being of local people’ (Blangy and Wood, 1993) – has been growing even faster at the global level, at rates up to two or three times higher than normal tourism activities (FAO, 2011). Ecotourism allows countries to take advantage of, and at the same time preserve, their natural capital (e.g. forests and ecosystem services) through tourism-related activities and products aimed at environmentally aware international tourists.

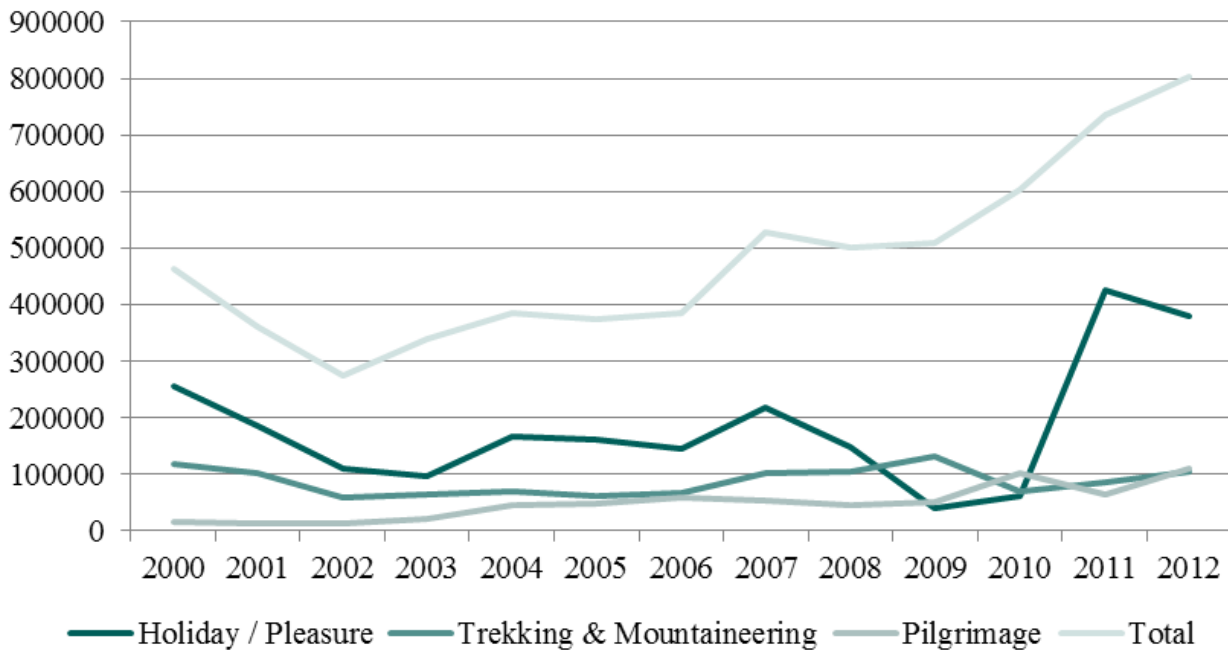
By promoting sustainable forest management – creating alternative livelihoods to unsustainable logging and the conversion of forest areas to other land uses – ecotourism can create stronger incentives for green growth outcomes. In addition, there is often greater scope for inclusion of local communities in the value chain because they tend to provide the majority of ecotourism services, as opposed to larger international or national tourism service providers (ibid).

5.1 Tourism in Nepal

The number of tourists visiting Nepal over the last decade has grown steadily, since the country returned to a situation of peace and relative stability after the civil war. Tourist attractions include the Himalayas as well as historical sites of cultural and religious significance, such as the four UNESCO World Heritage Sites. The country has significant natural and cultural capital that gives it a potentially significant competitive advantage in the tourism sector. Nepal has a particularly strong reputation as a mountaineering and trekking destination, although many in the industry are keen to focus on broadening its appeal and attracting a wider set of tourists, particularly high-income tourists who may generate a higher economic contribution per head. This appears to be happening, according to official statistics – see Figure 3 below.⁴¹

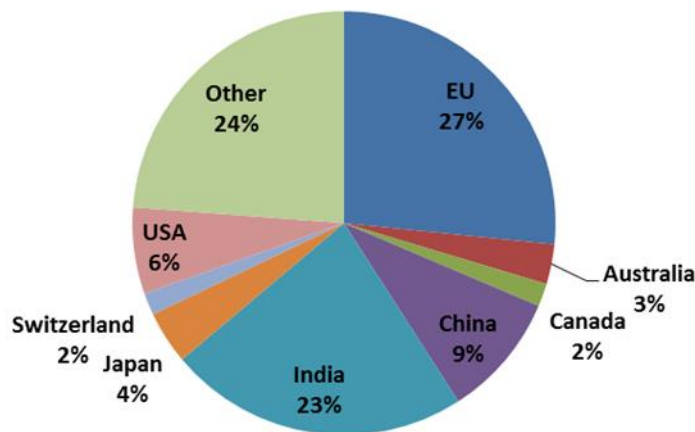
⁴¹ See: <http://www.tourism.gov.np/uploaded/TourismStat2012.pdf>

Figure 3: Number of visitors in selected tourist categories 2000-2012



Source: Nepal Tourism Statistics 2012

Figure 4: Tourist Arrivals in Nepal 1999-2012



Source: Nepal Tourism Board (NTB) (2012)

The major tourist market for Nepal is the European Union, which in 2011 accounted for 27% of all arrivals. India is the second largest market (by a small margin) followed by China and the US. Despite rapid growth, tourism's direct contribution to the Nepalese economy is still only 2.8% of GDP, with a total contribution – including through indirect market linkages – of about 6.7%. According to the Ministry of Culture, Tourism and Civil Aviation, in 2011 tourism accounted for 44.5% of revenues from merchandise exports and 23% of revenues from total exports (i.e. both goods and services).

Table 12: Tourism Indicators for Nepal (2011)

Direct Contribution to GDP (%) 2011	Total Contribution to GDP (%) 2011	Contribution to Employment (% total emp.)	Foreign Tourist Expenditure (US\$ bn.)	Capital Investment (US\$ bn.)
2.8	6.7	5.8	0.443	0.151

Source: World Travel & Tourism Council (WTTC) (2012)

The Government of Nepal recognises that a number of challenges need to be addressed in order to attract more international tourists. Foremost of these is the need to strengthen tourism infrastructure, i.e. develop efficient road networks and an airport that is up to international traveller standards. Nepal has a geography that makes transport infrastructure difficult to build; over 80% of the country is covered in mountains or hills, which make road and rail construction more expensive than on flatlands. Transport infrastructure is currently poor, with only 32% of the country's rural inhabitants able to access roads 2km away or less (Barahi et al., 2011).

Underdeveloped transport links mean that tourism activity is concentrated in relatively well-served areas. The Government of Nepal is, however, currently undertaking a systemic road construction programme that aims to link all regional 'capitals' to Kathmandu as well as provide ease of access to education and healthcare in the regions, which could have potential spillover effects on tourism.

Nepal's landlocked status also means that it is highly dependent on air travel for foreign tourist arrivals. In addition, regulatory constraints such as complicated licensing procedures disincentivise private investment, and regular national strikes and demonstrations serve to disrupt transportation and deter tourists.

Despite these constraints, Nepal is aiming to establish itself as a major global destination for tourism, which is seen as a viable way to generate foreign exchange, bolster national income and create new employment opportunities. Efforts have been built around particular campaign drives such as the 'Nepal Tourism Year 2011,' during which the Government aimed to make improvements in tourism infrastructure and strengthen tourism service providers. The objective was to attract one million tourists, but this target was not achieved, a failure that some attributed to a poor international marketing campaign.

Ecotourism occurs in a number of areas in Nepal, e.g. the main trekking trails in Annapurna, Khumbu and Langtang, as well as protected areas such as the Annapurna Conservation Area, Sagarmatha National Park, Chitwan National Park and Langtang National Park. These areas, scattered across the country, are major tourist destinations, attracting more than 50% of the total foreign tourists in Nepal (Ministry of Population and Environment (MOPE), 2004). Ecotourism activities include trekking expeditions, wildlife watching and mountaineering activities, mixing camping and overnight stays in lodges managed by local communities. Ecotourism represents a significant opportunity in Nepal, which has abundant wildlife attractions. The sector can help reduce poverty and create income growth in remote rural areas, and encourage investment in infrastructure (MOPE, 2004). It can also incentivise the conservation of forests as assets that need to be protected to maintain their value. Indeed, the value of areas high in biodiversity and wildlife may increase over time, as demand increases and supply falls globally.

However, ecotourism also creates trade-offs: for example, infrastructure development in these regions threatens the pristine environment that attracts tourists (as discussed in the forestry section). In addition, tourism development can create visual pollution, erode soil, introduce foreign floral species, increase waste pollution, increase use of wood for fuel by tourists, and increase the number of forest fires (MOPE, 2004). Thus, an appropriate balance must be struck between conservation and tourism

development, to support livelihoods and at the same time preserve the value of these assets for the future.

5.2 Tourism and climate change

As discussed previously, most climate scenarios for Nepal show that there will be less rainfall and rising temperatures, with estimates of potential increases of between 0.5°C and 2.0°C by 2030, and up to 4.7°C by the 2090s (Nepal Climate Vulnerability Study Team (NCVST), 2009). Studies also suggest that by 2060 there may be an increase of up to 55% in the number of ‘extremely’ hot days (i.e. well above average temperature) and 77% in the number of ‘extremely’ hot nights (Dixit, 2011). There is greater uncertainty about impacts on rainfall. There could also be changes in the ability of particular areas to grow particular crops, which could create increased competition for certain areas of land.

In a paper by Nyaupane and Chhetri (2011) it is indicated that changing climatic conditions will have variable impacts on tourism, dependent on the physical characteristics of the regions. In the country’s north-eastern areas, where there are more mountain parks, there could be increased avalanches and glacial lake floods, while hilly and lowland regions such as the Terai may see more landslides and flash floods. Such hazards would have a negative effect on tourism infrastructure, including road damage, decreased availability of hydroelectricity, and damage to trekking trails and tourist facilities.

Of particular concern is the impact of climate change on glaciers, and the increases in snow melt and glacial lake outburst floods that may negatively affect tourism in the mountainous areas such as Everest, Annapurna and Langtang (Dixit, 2011), since the natural beauty of the areas could deteriorate, and trekking in them could become more risky. There may also be indirect effects of climate change on tourism, such as decreased crop yields leading to decreased food availability and hence higher prices, which in turn could lead to more competition for food resources between tourists and local people. In addition, agricultural shifts may cause farmers to start using previously wild areas, removing their allure to nature tourists (Brinkman, 2012).

Another threat to the tourism industry arises from the ‘Atmospheric Brown Cloud’ (ABC) that has been identified as affecting parts of South Asia including the Himalayas. This has health effects and may also change rainfall patterns and cause the possible retreat of the Hindu Kush-Himalayan glaciers and snow packs (Ramanathan et. al, 2008), as well as undermining the pristine landscape that attracts trekkers and mountaineers to Nepal.

5.3 Carbon mitigation threats to Nepalese tourism

Increased air travel costs arising from higher fuel prices and aviation carbon taxation may reduce long-haul flights, affecting tourism growth potential. Air passenger duty is being imposed by a number of countries, and air travel is now a part of the European Emissions Trading Scheme, which could affect prices of travel to long-haul destinations such as Nepal; however, this is likely to represent only a small proportion of the total cost of air travel, and evidence suggests that tourists may be relatively price inelastic, so the ultimate effect on tourism numbers may be limited. In addition, as much of the growth of tourism to Nepal is from neighbouring countries rather than from more-distant, rich countries, these risks may not represent too significant a threat.

5.4 Environmental impact of tourism

The tourism industry can be an advocate of environmental sustainability, but tourism can also damage the environment and create challenges for natural resource management. Within Nepal, the Government has introduced Environmental Impact Assessment standards as well as improved water management systems that all new tourism buildings must adhere to, and a number of sustainable tourism initiatives and projects have been implemented. Some are projects with particular goals in mind, such as eliminating plastic waste from tourism (see Box 1 below), while others take a more comprehensive approach, such as the Marketing Assistance for Sustainable Tourism (MAST) project

(See Box 3), which involved the introduction of sustainable tourism practices to local tour operators and subsequent marketing of their activities to international tour operators.

Some hotels and tourist operators have focused on building a reputation for social responsibility and environmental sustainability (see Box 2). This could yield a competitive advantage in a world of increasingly environmentally conscious consumers – particularly at the higher-value end of the tourist market.

Box 1: Freemalaya⁴²

Freemalaya is a campaign to ban plastic products from the Nepalese Himalayas. The initiative was set up in 2012 by Jerome Edou and Adhish Gurung, members of the Nepalese trekking industry, inspired by similar bans in northern India (Ladakh region) and in Bhutan. The campaign involves local tour operators and international operators asking their clients to bring their own reusable non-plastic bags and bottles for their trip to Nepal. The campaign also promotes the use of solar water heaters in rural areas, so that tourists can boil water to purify it, and it provides income opportunities for communities to sell locally produced filtered water.

Box 2: The Explore Nepal Group⁴³

The Explore Nepal Group takes various actions to improve the sustainability of its hotel operations, including energy-efficiency measures such as installing more-efficient light bulbs, avoiding the use of air conditioners or elevators in its enterprises, and using renewables for some operations, such as solar water heating for its hotels. The company also reduces its water use by minimising the amount used for cleaning (i.e. allowing hotel guests to decide whether their linen needs to be changed). The use of plastic is minimised in favour of glass or metal, and all waste material produced during trekking activities is collected.

The group has an eco-hotel in the centre of Kathmandu that uses local traditional architecture to maximise temperature efficiency and comfort in the rooms, uses solar water heaters, and has adopted a green purchasing policy that prioritises the use of locally grown, organic food in its restaurant.

Tourism service providers also have implemented a number of environmental initiatives such as planting trees, trying to ban plastic bags on treks, promoting clean trekking routes and providing environmental training to local communities. Green tourism projects broadly fall under the following categories:

- Energy efficiency and renewable energy generation projects: reducing energy use in tourist facilities, such as by using solar water heating and solar PV in hotels.
- Waste management: reducing or eliminating the use of plastic (i.e. bottles and bags) and keeping trekking trails rubbish free. Improved waste management can lead to reduced costs for tourism businesses as well as opportunities for new enterprises that support tourism services, such as those that recycle products or manage waste, with associated employment creation opportunities.

⁴² <http://www.freemalaya.org/>

⁴³ <http://www.explorenepal.com/>

- Water management: reducing water usage, i.e. through reduced toilet flushing and optional washing of bed linens in hotel rooms, as well as more-sustainable water use, i.e. using locally filtered water instead of imported water.
- Reduction in transport emissions through campaigns and initiatives to eliminate highly polluting transport systems and vehicles. For example, three-wheeled, highly polluting diesel ‘tempo’ taxis have been banned in Kathmandu and replaced with electric powered taxis.⁴⁴

As discussed above, Nepal suffers from very high costs of energy and poor access, and this has hampered the development of the tourism industry as it has other sectors. There is considerable scope for the hotel industry to use renewable energy and adopt energy-efficiency measures, such as solar lighting and solar water heaters that would create savings over time. However, due to high upfront costs associated with renewable appliances, as well as a lack of awareness of potential savings, most businesses in the tourism industry use traditional fossil fuel-based solutions such as diesel-powered generators.

Solar water heating is being used, however, by a number of tourism enterprises, e.g. Explore Nepal (see Box 2) and Himalayan Encounters, and this has sometimes helped them avoid paying grid connection charges (United Nations Environment Programme (UNEP), 2008). The tourism enterprise named Last Resort reduced energy use through utilising more efficient light bulbs, which helped it save 15% on energy costs each month.

Access to finance for the upfront investment is also a problem, although institutions such as the Clean Energy Development Bank (CEDB), which offers loans to private enterprises to invest in renewable energy, may help to address the problem. However, there is little scope to subsidise this kind of investment, given government budget constraints, and the policy framework does not create clear incentives. For example, the lack of feed-in tariffs or net-metering hinders the uptake of renewable energy technology by tourism operators, who may otherwise invest in such technologies if potential revenues could be generated from them. The introduction of energy-efficiency audits could also help; they have been introduced in other LICs with impressive results in terms of energy savings, which improve competitiveness and reduce carbon emissions.

Water management activities can help increase the number of guests who can be sustainably maintained in areas with water scarcity, and there are also short-term returns to investment on water saving initiatives. It has been found that surface and groundwater supplies in major tourism areas (such as the Kathmandu Valley) are being used unsustainably, with extraction levels twice the estimated sustainable levels (UNEP, 2008). Hence, initiatives like the one undertaken by Syangboche Hotel, which has installed a rainwater collection system that has helped reduce water usage (sourced from local communities) by up to 60%, can make a big contribution to the sustainability of the tourism sector, and will become essential if tourist numbers grow.

Box 3: MAST Nepal⁴⁵

The ‘Marketing Assistance to Nepal for Sustainable Tourism Products’ programme was launched by SNV Nepal in 2006 and ran until 2008. The programme had a number of objectives, including the development of sustainable tourism products aimed at the European market and the creation of stronger business links between Europe and Nepal. The programme also aimed to raise awareness of the need to provide sustainable tourism services within Nepal. The programme was considered a success in terms of its engagement with the private sector, as it provided incentives for tourism enterprises to invest in sustainable practices and help build the capacity of the sector. The project resulted in the development of sustainable tourism products in 23 of the 30 companies it engaged with, introducing waste management,

⁴⁴ <http://xplorenepal.com/sustainability.php>

⁴⁵ <http://www.unep.org/eou/Portals/52/Reports/Mast%20evaluation%20-%20Final-August08.pdf>

preservation and training activities.

Box 4: Great Himalaya Trail – Nepal⁴⁶

The Great Himalaya Trail (GHT) programme, a joint initiative of the Government of Nepal, the UK's Department for International Development (DFID) and SNV, works with Nepalese tourism enterprises to ensure the trail is developed into 'an iconic and globally significant new tourism product' that is managed with sustainable practices and contributes to the country's natural and cultural heritage. The GHT is focussed on the promotion of trekking activities within the Nepalese Himalayas and surrounding environs, in recognition that the trail has great potential to provide a significant boost to the country's tourism industry and its various support sectors, thus supporting inclusive growth. The GHT is collaborating with Travelife to develop the 'Responsible Travel Nepal' programme, aiming to improve the sustainability of Nepalese travel companies and to generate increased revenues.

Trekking and mountaineering can also have negative environmental impacts. The two activities – which tend to be concentrated in environmentally fragile areas (such as the Himalayas) – create water and land pollution (due to the construction of tourism facilities), increase waste, and increase use of fuel wood (MOPE, 2004).

Box 5: Nepal Environment and Tourism Initiative Foundation (NETIF)⁴⁷

NETIF builds links between tourism enterprises and the local communities they operate in by promoting collaboration on environmental issues and creating livelihood opportunities for community members. One project being developed is the Payment for Environmental Services (PES) Action Research Project. NETIF states that PES is a new concept in Nepal. The scheme charges downstream users of rivers for 'services received', e.g. in the form of an improved water supply, and pays upstream community groups for providing those services through conservation management. The project is being piloted in the Shivapuri Nagarjun National Park. Park rivers supply 66% of Kathmandu's water; hence the project promotes both water conservation in the National Park and improved water supplies in nearby urban areas. Other NETIF projects include the construction of environmentally sensitive tourism infrastructure, capacity-building for sustainable tourism activities for local communities, and the environmental management of selected trekking trails.

Pressure from international tour operators for more sustainable operations is slowly growing. Partly this reflects demand from customers for more sustainable holidays, but it is also a result of pressure from investors. This voluntary self-regulation is exemplified by the Travelife Award system – an international certification scheme, set up by tourism industry members, that awards Gold, Silver or Bronze ratings to participating hotels and accommodations (currently represented in 25 countries, of which Kenya is the only LIC to date) based on a number of environmental and social criteria.

⁴⁶ www.thegreathimalayatrail.org

⁴⁷ http://www.netif-nepal.org/about_us.htm#Vision

Growth of such certification schemes may drive increased water, energy and carbon footprinting, and compliance may become increasingly important in order for Nepalese tourism companies to remain competitive going forward. Thus, putting in place the necessary natural resource management policies, regulations, and private sector incentives for efficiency and sustainable natural resource management could help to enhance the sector's competitiveness. This could be especially beneficial for early adopting countries, who can establish a reputation and associated international 'brand' for green tourism (ERD, 2012). However, environmental awareness is relatively low amongst tourists from within the region; thus, pressure to adopt green measures may be less evident in current patterns of tourism growth in Nepal.

Climate finance could potentially support the development of sustainable tourism, for example by supporting the use of solar power by hotels, or by supporting ecotourism projects as a way to promote sustainable forest management.

5.5 Interactions between infrastructure, tourism and the environment

The Government of Nepal is currently building a series of roads to connect all the provincial 'headquarters' cities within the country. This will have an impact on tourism by opening up regions that have been previously overlooked due to their inaccessibility.

However, it has been reported by various members of the Nepali tourism industry that the construction of new roads has contributed to environmental or economic damage such as

- trekking trails destroyed during road construction
- local products (such as food or locally produced handicrafts) substituted by more competitive imported products after roads are built
- deforestation, when badly managed road construction works resulted in losses to forest cover.

Road construction and expansion works have allegedly helped decrease the price of imported goods into the affected areas by at least 50%, but have at the same time reduced the number of foreign tourists visiting some affected areas since certain trekking trails were removed during the road construction process (Brinkman, 2012).

Box 6: Rural Access Programme⁴⁸

DFID, together with the Government of Nepal, is carrying out the 'Rural Access Programme' (RAP). The programme aims to reduce poverty in rural communities across Nepal by improving access to transport by constructing roads. The transport infrastructure is meant to be constructed in a labour intensive and environmentally friendly manner, with environmental mitigation measures taken both during and after construction activities.

Evaluations have shown that there have been net benefits for the businesses in affected areas, both farms and other enterprises; for example, agricultural productivity has improved, and the number of hotels has increased.

The Phewa Lake Dam (close to the city of Pokhara and situated in a major tourism hotspot) serves to illustrate the potential complementarities and trade-offs of different economic activities. The dam provides hydroelectricity as well as water regulation services, and also creates opportunities for a number of water-based tourism activities. The dam is thus a good example of how energy, environmental regulatory services and tourism activities can be complementary. However, the dam is suffering from increased siltation (Pokharel, 2008), which could undermine these benefits. Rising

⁴⁸ <http://www.rapnepal.com/Publication/Impact%20Assessment%20Report%20RAP%20I.pdf>

siltation levels have been attributed to increased deforestation activities around the lake, while pollution levels have also increased, as a result of waste from local settlements and activities. This illustrates the complex interactions between different economic activities, and highlights the need for a coordinated approach to natural resource management that takes into account wider socioeconomic impacts and trade-offs.

5.6 Conclusion

Table 13 below summarises the main opportunities and risks that are currently faced in Nepal's tourism sector associated with the three key drivers identified at the beginning of this report: natural resource scarcity, international mitigation policies, and the impact of climate change. Possible policy and business responses are suggested, for further discussion and exploration at the national level.

Table 13: Summary of tourism sector opportunities and risks associated with three drivers

Opportunities / risks	Implications / responses
Natural resource scarcity	
Growth of tourism creates challenges for natural resource management (water and energy), including threats to the value of existing tourist attractions from pollution and waste creation.	Invest in diversification of tourist attractions to reduce pressure on particular areas and promote more widespread benefits. Invest in infrastructure and services (e.g. water and sanitation) necessary for sustainable expansion of tourism. Develop appropriate regulatory framework. Raise awareness on natural resource management and green and sustainable tourism, in the community and with tourists themselves.
Increased access to rural areas could increase tourist numbers but also damage natural tourism assets.	Develop coordinated strategy for tourism development involving all relevant Ministries and stakeholders to balance competing objectives, and establish appropriate regulatory framework.
Poor access to energy, and high costs, reduce competitiveness in the short term but could promote greater use of renewable energy sources and energy efficiency, reducing costs and improving competitiveness over time.	Create appropriate incentives for investment in energy efficiency and alternative energy sources, e.g. solar water heaters.
Climate change mitigation policies	
Increased demand for sustainable tourism standards and certification. Increased use of sustainable tourism initiatives by Nepalese enterprises can help them better market themselves at the global level, attracting environmentally conscious tourists.	Establish Nepal's brand as a green tourism destination to create a competitive advantage. Introduce and strengthen standards, labels, award schemes that reward green credentials in the tourism industry. Consider joining international Travelife Award scheme. Undertake targeted marketing to environmentally conscious, high-value tourists
Carbon taxation schemes could potentially increase travel costs to Nepal and reduce tourist numbers.	Promote tourism from within the region.
Climate finance could support sustainable tourism initiatives or support ecotourism development to promote sustainable forest management.	Develop a strategy that optimises contribution from public sources of climate finance.

Tourism industry as an advocate and driver of green growth patterns.	Collaborate with the tourism industry in rolling out initiatives to promote clean, attractive environment, and raise awareness.
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Impact of climate change

Climate change effects e.g. increased glacier melt and glacial lake floods (and the Atmospheric Brown Cloud) could threaten some tourism activities and infrastructure.	Undertake more detailed analysis of the potential impacts of climate change on tourism in different locations, and adapt infrastructure and services appropriately.
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Nepal has substantial natural assets and has benefited significantly from the fast growth of tourism in the last 10 years, and there is still much potential for further growth in the industry. However, appropriate management of natural resources, and sensitive, well-regulated infrastructure development, are required to ensure that continued growth is not undermined. Similarly, there is potential to develop the ecotourism sector further, which could help Nepal to take advantage of, and at the same time preserve, its natural assets, such as forests, water and wildlife. However, a balance must be struck between developing the sector and maintaining the environmental assets that attract tourists in the first place.

Increasing international emphasis on environmental credentials within the tourism industry is inevitable going forward, and will reward those tourism destinations that are perceived as relatively green. Thus, establishing Nepal’s brand as a green tourism destination could be important to creating a competitive advantage for the future – even if current sources of demand from within the region are not yet placing much importance on these issues.

Within that context, investment in renewable energy and energy-efficiency measures by hotels can provide both cost advantages and reputational benefits. However, there appears to be less awareness about these issues within Nepal than there is within other countries, so publicising the benefits and providing support and incentives for these investments may be warranted to maintain a competitive sector. Climate finance could potentially support the development of a green tourism sector, for example by supporting energy audits or the introduction of green energy by hotels, or by supporting ecotourism projects as a way to promote sustainable forest management.

The tourism industry itself has an interest in developing a sustainable and environmentally conscious sector, and in protecting the natural environment, and thus can act as an important advocate of green growth policies. As this study has shown, there are many potential synergies between developing a sustainable and lucrative tourism sector, and promoting sustainable and inclusive growth.

6 Conclusions

The Nepal Trade Integration Strategy 2010 identified the expansion of trade as one of the key drivers of inclusive growth in Nepal going forward. This and the more recent Immediate Action Plan on Economic Development and Prosperity, published in 2012, set out a number of policies to promote export competitiveness and growth. The success of these policies will depend to a large extent on the global trade patterns shaping the opportunities that Nepal faces.

Our analysis suggests that over the next 10 years, global trade patterns will be transformed by climate change, international mitigation, and natural resource scarcity, resulting in an inevitable shift over time to a low carbon global economy. This study has been asking what this might look like. What impact will it have on Nepal's competitiveness and growth? What threats and opportunities will it create? And how should policy-makers and businesses respond?

This report has examined how these issues could play out in Nepal over the next decade, particularly focusing on the energy, forestry and tourism sectors. It has identified potential opportunities and threats to Nepal's competitiveness and growth, and possible policy responses.

The energy sector

The availability and reliability of energy, especially electricity, are major constraints on competitiveness, growth and living standards in Nepal. Yet the potential to develop hydropower and other renewable energy sources is substantial. Many opportunities for investment have been identified, but their development is hampered by a poor investment climate and weak institutional mechanisms and governance.

A diversified energy mix is required, potentially through the development of solar PV and wind energy in addition to hydropower, as too much reliance on hydropower could undermine resilience, given the impact of climate change on hydropower generation capacity.

Almost all of the fossil fuels used within Nepal are imported, and diesel and LPG are subsidised. But financial constraints undermine the ability of the Nepal Oil Corporation to ensure supplies and to invest in distribution infrastructure to meet growing demand. Subsidising fuel disincentives renewable energy investment and energy-efficiency measures by companies, which will undermine competitiveness in a future carbon constrained global economy. In addition, rising energy prices will make subsidising diesel and LPG less affordable over time, exacerbating public finance problems.

There are many economic opportunities that could be explored relating to potential new markets for biogas and biofuels. In addition, there is much scope to undertake energy-efficiency measures, which could significantly improve the competitiveness of Nepal's industries. Such measures have generated substantial savings in other countries that have taken a more proactive approach to incentivising the private sector through energy audits and regulation.

Possible policy responses:

1. Remove subsidies on LPG and diesel to improve future competitiveness, and find mechanisms to further incentivise industrial energy efficiency – for example, through regulation, awards, demonstration projects, or enhanced access to finance to cover upfront costs.
2. Strengthen and encourage investment in renewables and innovative ways to access electricity to improve competitiveness in the long term. Investment in hydropower should be balanced by some diversification of energy sources to increase resilience to climate change impacts. Consider a greater focus on small hydro, which would spread the risk by having more dispersed sites for power generation.
3. Support the development of commercial biogas production through an appropriate investment climate and regulatory framework, and through mechanisms to support access to finance, to overcome upfront costs. Encourage foreign investment to bring capital and technology.

The forestry sector

The unsustainable exploitation of forests can undermine growth and competitiveness in the future, by jeopardising forest-dependent livelihoods and depleting natural assets. Stronger incentives to protect the forest can be created by developing sectors that rely on sustainable forest management, such as ecotourism, and products with export potential such as medicinal and aromatic plants.

The introduction of community forestry management has successfully reduced deforestation and yielded economic benefits for participating communities. However, the model is facing some implementation challenges and further reforms could potentially help to improve its impact.

Exploitation of Nepal's forests still continues in an uncontrolled fashion in many areas. Forests inevitably compete with other land uses, including agricultural production, settlement, and infrastructure development. Logging continues in light of lucrative domestic and export markets for both timber and fuel wood. Some of these processes are part and parcel of development, and some degree of forest exploitation is inevitable and indeed desirable in a growing economy. Infrastructure development and firewood availability are important for the wider competitiveness of the national economy. However, it is clear that a balance needs to be struck between competing national development priorities.

One part of the solution to unsustainable forest use is appropriate forest management at the national level, and better enforcement of existing laws and regulations. But another part is creating stronger economic incentives to protect the forest, by facilitating the development of alternative livelihoods that are consistent with forest conservation. Community forest user groups are one way to achieve this, as they have relatively strong incentives to identify and develop livelihoods based on sustainable forest use. Private management of forest resources, along with an appropriate incentive mechanism and regulatory framework, could also provide a possible model for more sustainable forest management that would potentially help to commercialise the forest sector further.

Forest-dependent livelihoods can be based on sustainable harvesting of timber or fuel wood, or of non-timber forest products, particularly those in which Nepal has a significant competitive advantage, such as medicinal and aromatic plants. There appears to be considerable scope to develop these markets further and to develop Nepal's export competitiveness and manufacturing base on the back of these products in a way that also contributes to sustainable forest management. However, there are many challenges to be overcome relating to standards and certification, marketing and branding, labour supply, and the investment climate.

Possible policy responses:

1. Implement multi-stakeholder processes to develop a joined up strategy for forest management that balances competing national development priorities, and focuses on creating livelihoods that are based on sustainable forest management and that contribute to ongoing competitiveness and long-term growth.
2. Continue to expand community forestry and undertake reforms to improve implementation. Help build sustainable livelihoods for community forest user groups, by supporting their attainment of Forestry Stewardship Council certification for example, and by helping them to benefit from ecotourism opportunities.
3. Explore the potential for increased commercial development of the forest sector through the implementation of leasehold forestry as set out in the Immediate Action Plan on Economic Development and Prosperity (2012), ensuring that long-term sustainability considerations are taken into account, and that a strong regulatory framework is in place.
4. Through public-private dialogue, identify and devise a strategy to sustainably develop non-timber forest product markets in which Nepal has a potential competitive advantage; for example, by putting in place the necessary market institutions, such as standards and certification mechanisms, and tackling barriers to moving up the value chain.

The tourism sector

Nepal has substantial natural assets and has benefited significantly from the fast growth of tourism in the last 10 years, and there is much potential for further growth in the industry. However, appropriate management of natural resources and sensitive, well-regulated infrastructure development are required to ensure that the growth of the tourism industry (and the value of the natural assets upon which it depends) is not undermined over time.

There is potential to develop the ecotourism sector further, which could help Nepal to take advantage of – and at the same time preserve – its natural assets, such as forests, water and wildlife. However, a balance must be struck between developing the needed tourism infrastructure and maintaining the environmental assets that attract tourists in the first place.

Increasing international emphasis on environmental credentials within the tourism industry is inevitable going forward, and will reward those tourism destinations that are perceived as relatively green. Thus, establishing Nepal's brand as a green tourism destination could be an important source of competitive advantage for the future.

Within that context, investment in renewable energy and energy-efficiency measures by hotels can provide both cost advantages and reputational benefits. However, there appears to be less general awareness about these issues within the tourism industry in Nepal than there is within some other countries.

The tourism industry itself has an interest in developing a sustainable and environmentally conscious sector, and in protecting the natural environment, and therefore can act as an important advocate of green growth policies. Thus, there are many potential synergies between developing a competitive and sustainable tourism sector, and promoting sustainable and inclusive growth.

Possible policy responses:

1. Develop a coordinated strategy for tourism development, involving all relevant Ministries and stakeholders, to balance competing interests with regard to natural resource management and infrastructure development, and to establish a regulatory framework that supports a sustainable, competitive tourism industry.
2. Promote the synergies between tourism development and sustainable growth by establishing Nepal's brand as a green tourism destination and thus creating a competitive advantage. To complement this, introduce and strengthen standards, labels, and award schemes that reward green credentials in the tourism industry, including for example the international Travelife Award scheme. Consider supporting targeted marketing to environmentally conscious, high-value tourists.
3. Collaborate with the tourism industry in supporting initiatives to promote a clean, attractive environment, and raise awareness about the competitiveness benefits of energy efficiency and renewable energy usage.
4. Identify opportunities for using climate finance to support the development of a green tourism sector, for example by supporting energy audits or the introduction of green energy by hotels, or by supporting ecotourism projects as a way to promote sustainable forest management.

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