

CASE STUDY:

Nepal's Agriculture, Climate
Change and Food Security:
Country Analysis and
Programming



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Glossary

Adaptation. The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to the expected change in climate and its effects. Recently, the definition of adaptation has differentiated between ‘incremental’ and ‘transformative’ – relating to whether it aims to keep existing structures in place or to make significant fundamental changes to these.

Agriculture. The science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool and other products. In this brief it includes fisheries but does not include forestry.

Climate change mitigation refers to efforts to reduce or prevent emission of greenhouse gases.

Climate change. A change in global or regional climate patterns. In particular a change apparent from the mid to late 20th century onwards and attributed largely to the increase in atmospheric carbon dioxide produced by the use of fossil fuels.

Climate resilience. The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation.

Food insecurity. Insufficient supply of food that may cause hunger (food deprivation), malnutrition (deficiencies, imbalances or excesses of nutrients) and famine.

Food security. A state or condition where all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

Undernourishment. Not having enough food to develop or function normally.

Vulnerability. This is the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm, and lack of capacity to cope and adapt.



Executive Summary

This brief is a country case study of Nepal produced alongside the DFID Topic Guide on Climate Change, Food Security and Agriculture. It highlights how climate change affects the situation of food security and agriculture in Nepal. The aim is to provide country offices with specific guidance on activities, barriers and opportunities for integrating climate change and Climate Smart Agriculture (CSA) approaches within the national context.

Nepal's government is aware and strongly committed to tackling climate change both nationally through programming, and internationally as chair of the Least Developed Countries Group in the international climate negotiations.

This is despite, and because of its poverty

Nepal is one of the poorest countries in the world, with an income of US \$730 per capita and 25% of its population in poverty. It is highly dependent on remittances from overseas, with just under one third of its GDP from this source.

Nepal's Agriculture is important but seriously underdeveloped


Agriculture is vitally important to Nepal, employing 65% of the workforce and generating over one third of the country's GDP. However, Nepal does not grow enough food to support its population: 14% of the population are food insecure, and two thirds of the population are food insecure at certain points of the year.

Nepal's agriculture is mostly smallholder production on rain-fed or irrigated, ecologically diverse, on farms of less than 1 ha in size. Smallholder agriculture covers 16% of the country, the rest being uncultivable mountain regions. Poverty is predominantly rural, with significant proportions of rural landless labourers, and social, gender and ethnic inequalities pervading the sector. The foreign aid sector supports significant numbers of agricultural projects individually. Nepal's government investment in agriculture has been low at about 2-3% of GDP in recent decades.

Chronic structural rural development issues beset the sector precluding its transformation into either a thriving economic powerhouse or a sector capable of supporting its own population. These include: lack of access to markets and weak road infrastructure, governance issues and high gender inequality. High rates of population growth and landholding fragmentation fuel migration and a significant remittance economy. Agricultural productivity is low overall. However, recent tailored projects have started to develop a small, successful agribusiness sector for smallholders that demonstrate some promise for future economic growth and food security improvements.

Climate Change Impacts on Nepal's farming are real now, and serious in the future

Climate change is affecting the environmentally- vulnerable geographical region of the Himalayas in Nepal, and is a high priority for Nepal's Government. Extreme events such as landslides, droughts and floods are common and increasing in frequency. Disaster risk reduction is a priority for aid programmes. Predictions of the impacts of climate change highlight that Nepal is one of the most climate-vulnerable countries in the world. It ranks as the 57th most climate vulnerable country in the world according to 2013 ND-GAIN index statistics (ND-Gain 2015). Models cannot predict rainfall impacts well, but overall indicate an increase in total precipitation and an increase in intense rainfall events. Mean annual temperatures are expected to rise between **1.8 and 5.8°C** by the 2090s. More frequent flooding and landslides are likely as a result of glacial melt.



The impacts of climate change on the rainfed agricultural systems of Nepal are significant. Long term reliable weather data in the region needed for prediction is sparse. A recent Government of Nepal report (GoN, 2014) estimates a 2-4% drop in current GDP per year due to climate change, with the need for USD \$2.4 billion investment in adaptation by 2030. Impacts on particular crops are potentially significant: productivity of rice, sugar cane and maize may reduce 4-16% by 2030.

But, Nepal has very low greenhouse gas emissions

Nepal currently has a climate-neutral development profile due to its forest stocks and low level of modernisation: its economy is reliant on low productivity hydropower and significant (though degrading) forest stocks sequestering carbon and a total of 0.1 ton / capita emissions. There are significant opportunities to engage with global climate finance around adaptation and mitigation through clean energy development and REDD+¹ approaches to forestry investment. Given Nepal's likelihood to base further development on hydropower, the need for mitigation of existing emissions is low. However, Nepal should consider future development scenarios where carbon emissions may be higher if forest resources are increasingly degraded and consumed, and emissions from the aviation and industrial sectors increase as the country develops.

Holistic Climate Smart Agriculture approaches for Nepal combine considerations of food security, adaptation and mitigation. In Nepal more than many other countries, opportunities are offered by the sectoral integration of water, energy and food security as water availability is a major limiting factor on crop yield. Nepal has a significant opportunity to develop its position as a carbon sink and develop cleanly if it harnesses its clean energy internally as well as for export markets, and if it focuses on the significant carbon stocks remaining in its forested areas.

Nepal is integrating climate change nationally into policy

The Government of Nepal is focussed on increasing productivity and sustainability, commercialisation, competitiveness and governance within agriculture. A series of detailed ministerial policies have been developed but are weakly implemented due to funding and governance constraints. Integration of agriculture with climate change policy is nascent, but increasing, and significant donor inputs are assisting with data creation and gap identification. The 2010 National Adaptation Plan of Action highlighted the agricultural sector, and many new programmes and projects integrate climate change issues through disaster risk reduction and resilience.

DFID Nepal has a three part mandate, one of which puts climate change central to its agenda to: “safeguard Nepal’s future from future shocks and stresses by helping to strengthen the policy and implementation of climate change adaptation approaches at the local level and supporting disaster risk reduction and strengthening local disaster management capacity” (DFID Operational Plan 2011-2014, updated December 2014) (see Annex 3). DFID has a target to increase the number of people with increased climate and disaster resilience and increase resilience through existing forestry initiatives. In this revised plan, DFID outlined four main areas of focus: i) supporting NAPAs; ii) working with forestry sector to increase resilience amongst the most socially disadvantaged; iii) increase climate awareness within DFID country office and iv) strengthen disaster risk management.

¹ Reducing Emissions from Deforestation and Forest Degradation (REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development.



Recommendations for future programming for DFID on Climate Smart Agriculture

1. Sustainable food security, adapted to climate change


- **Recommendation 1: DFID considers developing a more central role for work on climate smart agriculture as part of its new operational plan 2016-2020 as part of its portfolio. DFID continues to screens its portfolio for coherence with climate change adaptation and disaster risk reduction** on an ongoing basis and for all new projects, keeping low carbon where possible.
- **Recommendation 2: DFID supports initiatives that will strengthen key needs in the country for development and growth through its transformational change focus**, including political stability, inclusive growth, and the needs of women in particular. These support the broader economic development and opportunities for the region, providing enabling conditions to 'step up' or 'step out' of agriculture.
- **Recommendation 3: DFID supports (and potentially plays a coordinating role) in Climate Smart Agriculture initiatives, developing Selvaraju's (2014) recommendations.** These include: information gathering around impacts on agriculture at farm gate level through the food value chain to distribution, highlighting potential for decreasing waste, increasing value through pro-poor initiatives such as farmer agro-processing and improved quality of produce.
- **Recommendation 4: DFID supports and facilitates sharing of knowledge amongst ADB, World Bank, FAO, IFAD and leading NGOs on Climate Smart Agriculture and related forestry activities.**

2. Coordination in-country and assistance with Accessing Finance for Climate Smart Agriculture

- **Recommendation 5: DFID should report on access to development and climate finance through the international channels and bilateral donors and private sector (mitigation and adaptation)** especially around major investments planned e.g. in hydropower sector / infrastructure, both of which have been repeatedly identified as constraints to growth, and also around forestry initiatives.
- **Recommendation 6: DFID Nepal should monitor and support Nepal's engagement with international negotiations** especially as LDC Chair to ensure that the greatest efforts are achieved in terms of securing a binding agreement towards a 2°C or 1.5°C cap in global average annual temperature increase by 2100. Beyond this level, adaptation costs and impacts for Nepal become extremely concerning.
- **Recommendation 7: DFID should seek** opportunities for commercialisation of climate-resilient agriculture through the value chain with relevant partners e.g. IFAD's High Value Agriculture Project in Hill and Mountain Areas.

3. Nepal develops region specific programming and socio-economic analysis of adaptation options for climate change

Evidence suggests that adaptation options for farmers in Nepal need careful tailoring to diverse environmental, economic, social and institutional contexts within different regions. Selvaraju (2014) detailed a range of adaptation options for agriculture and livestock, building



on the NAPA, and we expect the Second National Communication on Climate Change to reinforce this with further analysis.

- **Recommendation 8: DFID collates, or supports collation of existing and new evidence that is region-specific**, and supports it being made publicly available through existing channels such as Nepal's Climate and Development Portal for development planners and investment planners.
- **Recommendation 9: The next research steps suggested in collaboration with Government** include a social and economic cost-benefit analysis on climate change and agriculture programme to develop, a feasibility analysis, financial support analysis, and implementation coordination and support. Key limitations of Government investment levels and extension reach to remote regions need to be considered as integral to any feasible approach.



SECTION 1

Food Security within Nepal's development context

1.1 Food Security

“Food production systems in Nepal are highly vulnerable to increasing climate variability and change...High rates of snow and glacial melting, frequent floods and droughts, heat waves, and increased incidence of pests and diseases are already causing widespread damage and loss to agricultural sector in Nepal”

Government of Nepal (2011) Priority Framework for Action: Climate Change Adaptation and Disaster Risk Management in Agriculture. p. 3.

Agriculture and food security are highly important in Nepal. Farming involves more than 65% of Nepal's population and produces over one third of Nepal's gross domestic product (Selvaraju, 2014)². Significant improvements have been made in terms of the proportion of population undernourished in the last 20 years, decreasing from 23% to 14% of the population (SOFI 2014). However, these improvements have been largely swallowed up by population increases – the actual numbers of people hungry over this period have dropped by only 14% from 4.2 to 3.6 million (SOFI 2014 p. 42). Many people and children are still going hungry and malnourished, with two thirds of Nepalese not having enough to eat at some point in the year (Feed the Future 2014).

Nepal's hunger is related to its poverty. Nepal is the poorest country in South Asia and the 13th poorest country in the world (Feed the Future 2014). Poverty and hunger are strongly linked. In Nepal, poverty is skewed rurally: 29% of rural dwellers are poor, in comparison to 8% of urban dwellers (Knight, 2014). In the Mid Western and Far Western regions, the proportion of poor rises to 45-46%, including destitute, illiterate, indigenous or landless people, heavily indebted small farmers and those suffering as a result of conflict, debt and land degradation (RPP 2013). Since 1990 food demand has increased beyond production and imports, leaving Nepal in food deficit, requiring food aid and a chronic food security problem (GoN 2010).

² Some estimates put this as high as 75% employment and 36% GDP from agriculture in Nepal (FCO, 2014)

Box 1 Agriculture in Nepal: the basics

Nepal's agriculture is highly diverse across its climatic zones, but restricted geographically: arable land makes up only 17% of Nepal's land area (see Figure 1). Traditionally these are split into sub-tropical lowland fertile Terai, where rice, pulses, wheat, barley and oilseeds are main crops, and cattle and buffalo the main livestock; temperate hill regions (rice, maize – wheat, barley and vegetables), and hill regions (millet, potatoes, barley, buckwheat, yak products). However, the ecological zones have significant intra-zonal variability in rainfall and seasonality.

Landholdings are small – 70% households have less than 1 ha, and cannot produce enough for their own subsistence. IFAD (2013) characterises Nepal's agriculture as providing 'low returns' with 'limited alternative employment opportunities'.

Access to water is a significant issue, with Nepal dependent on summer monsoon rains. Around 31% agricultural land is irrigated, but irrigation systems are poorly serviced. Glacier melt will increase flooding and also reduce seasonal supply of water to rivers.

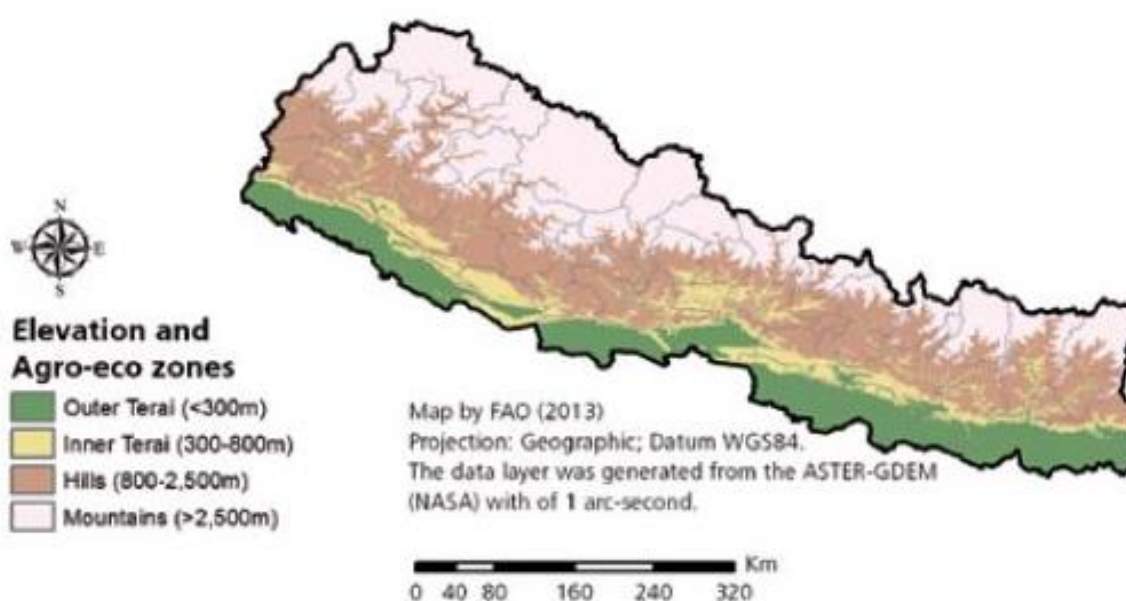
The farming system must be considered alongside forestry – agroforestry is integral to much of Nepal's rural landscape.


Increasing population pressure has led to unsustainable use of natural resources including overgrazing and deforestation and flooding, and significant pressure from those out-migrating from the hill regions to the more fertile Terai. Migration is a major coping strategy – either to other rural areas, urban centres or overseas.

Source: New Agriculturalist (2009); IFAD (2013)

Figure 1 Agroecological Zones of Nepal

Elevation and agro-ecological zones of Nepal





As Basnett et al. (2014) and Nepal's Country Investment Plan detail, agriculture is a complex sector, and recent performance has not been strong (See Box 2). Yield figures for major crops and labour productivity show that there has been little improvement in agricultural productivity.

The Country Investment Plan (GoN 2010) explains that the lack of advancement of Nepal's agriculture sector is due to:

- limited commercialisation and diversification
- weak support of agricultural extension service delivery system
- weak cooperatives
- encroachment into forest areas
- land reform issues
- weak irrigation infrastructure
- low food safety and quality unsustainable natural resource management limited institutional credit available
- low capacity in agricultural institutions and government.

In addition, there has been limited ability to perform some of the food processing activities that would enable a higher profit from a more processed product further up the agricultural value chain in recent decades. Deeper structural issues constrain agriculture, including lack of infrastructure, restrictions on market access and governance constraints (see Box 2). IRIN (2013) goes further to claim that Nepal's agriculture has suffered 'years of underinvestment, limited research and scant inputs, technology and services for farmers', reporting that Government spending on agriculture was only 2.6% of GDP in 2013.

Box 2 Overview of agriculture in structural economic transformation in Nepal

"Agriculture has performed poorly in recent years, with erratic growth rates and low gains in yields. Poor quality of produce prevents producers from accessing markets with higher returns, and farmers forego making productive investments, even where credit is not constrained. Despite out-migration, which reduces the pressure on land, weak property rights and poorly functioning land markets hinder landholders from transferring land to other potential uses.

The top-level constraints to growth in agriculture are similar to those that limit economy-wide growth. Political uncertainty prevents risk-taking and investment in agricultural production, and the poor state of Nepal's transport infrastructure constrains growth in all agricultural subsectors keeping transport costs high, and making farmers' involvement in markets expensive. Weak market institutions and regulatory frameworks constrain the use and adherence to contracts, and the adoption of quality standards. In addition, poor coordination of critical policies on fertilisers, irrigation and trade, and the politicisation of development projects create uncertainty and constrain delivery of inputs and services"

Source: Basnett et al. (2014), p. vi



Trends and future possibilities for growth in agriculture currently include:

- commercial agriculture (horticulture and dairy sectors);
- promoting agribusinesses to meet urban demand;
- improving economic infrastructure; and
- encouraging the investment of remittance incomes in the agriculture sector.

1.2 Impacts of climate change on Nepal's agriculture

Human induced climate change in Nepal is expected to affect what is already a very environmentally vulnerable region (Selvareju 2014). Extreme events such as landslides, droughts and floods are common, and increasing in frequency. Disaster risk reduction is a priority for aid programmes. Predictions of impacts of climate change highlight that Nepal is one of the most climate-vulnerable countries in the world (see Box 3). Erratic rainfall is expected - models cannot predict rainfall impacts well, but overall indicate an increase. Temperature rises beyond the global average have been observed in Nepal already. And mean annual temperatures are expected to increase an average of 1.2°C by 2030 (FAO 2014), and between 1.8 and 5.8°C by 2100 (McSweeney et al 2010)³.

Box 3 Overview Climate Change Impacts on Nepal

- Data is extremely region-specific in Nepal, given the different ecological environments. Some regions are experiencing higher variability in climate than others.
- Mixed data exist around historic annual mean temperature changes in Nepal. McSweeney (2010) finds no significant difference between 1960 and 2006 in Nepal. However, according to Marahatta et al (2011) most areas have experienced an increase in annual mean temperatures, between 0 and 0.08 degrees per year⁴. The Government of Nepal report a temperature rise overall in the country of 0.41°C/decade (in Selvareju, 2014).
- Frequency of hot days and nights has not changed significantly since 1960.
- By the 2090s, mean annual temperature is expected to increase between 1.8 and 5.8°C.
- Rainfall projections show that rainfall may decrease or increase, but is more likely to increase in Nepal overall, with more heavy events (-7 to +17% by 2090s).
- Similarly seasonal rainfall is more likely to increase in wet seasons.

Nepal is very vulnerable to climate change due to high exposure and low adaptive capacity as a result of hydro-meteorological hazards, dependency on agriculture, rapid population growth, shrinking farm size in the Terai region and continued unplanned agriculture in areas prone to climate risks (Selvareju 2014).

Good data and modelling is relatively scant in the region on impacts of climate change on both water supplies and agriculture, but changes in precipitation are notable, with some glaciers retreating and thinning, and an increase in Glacial Lake Outburst Floods within a complex climate context (IDS-Nepal et al. 2014). The direct cost of water-induced disasters including flooding (such as the Koshi flood in 2008 and West Rapti flood in 2012), and landslides is estimated at 1.5% of GDP (US \$270m in 2013), with wide variability (IDS-Nepal

³ Further details are available in the National Adaptation Plan for Action (MoE 2010) and Selvareju (2014).

⁴ See "Temporal and Spatial Variability of Climate Change over Nepal" (1976-2005)
https://practicalaction.org/file/region_nepal/ClimateChange1976-2005.pdf

et al. 2014). The Nepalese Government estimate a 2-4% decrease in current GDP per year due to climate change, with the need for USD \$2.4 billion investment in adaptation by 2030 (IDS-Nepal et al. 2014).

In farming, observed variability in climate has led to rain deficit, drought and floods in different parts of Nepal with significant (more than 10% and up to 30%) declines in production as a result. In addition, people have observed some shifting in climatic zones, and some early maturation of crops due to temperature increase, which has a positive impact on yields, and enables double cropping options in some areas (Malla 2008). Some summer crops (rice, wheat, barley) are more likely to have an increase in yield as rainfall and temperature maxima increase, whilst others (maize and millet) may decline, according to Joshi (2011). They advise a focus on potato and maize in the economically vulnerable Mountain and Hills areas of Nepal.

Impacts on initial modelling of agricultural yields show that impacts on food production are potentially significant from climate change: productivity of rice, sugar cane and maize may reduce by 4-17% by 2030 with a temperature increase of 2.5°C. But other studies point to potential increases in yields, especially in areas where growing seasons are currently limited by cool temperatures (Malla 2008).

1.3 Nepal's greenhouse gas emissions profile

Nepal's climate emissions profile is due to be updated shortly in Nepal's Second National Communication on Climate Change for the UNFCCC. Existing detailed data available is from 1992-4, which demonstrates that Nepal emitted about 39,000 MT greenhouse gases in 1994, less than 0.1 tons per capita. This puts it very low in emissions, almost climate-neutral.

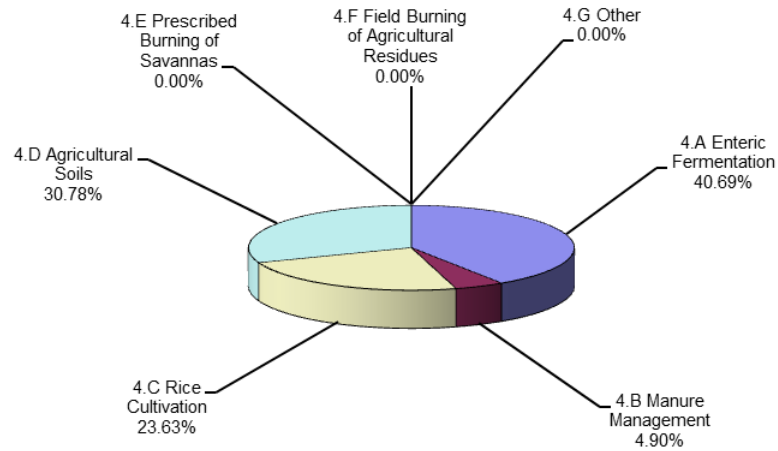
Agriculture is a key contributor to the climate emissions profile of Nepal (CDKN 2014). Within this overall low emissions sector portfolio, seventy percent of this comes from the agriculture sector rising to 90% when forests and land use change are included (see Table 1). Within agriculture, about one third of emissions comes from livestock stomach fermentation processes (principally bovine), just under one third from methane-producing rice cultivation methods and one third from techniques and practices of cultivation (see Figure 2). The Second National Communication may provide further evidence of interest to those seeking to reduce emissions from Agriculture Forestry and Land Use (AFOLU). At present, forestry is a critical carbon sink for Nepal, but deforestation and degradation would shift it rapidly to being a carbon source.

Nepal's Sector	Emissions CO ₂ e (Mt)	Percentage of total emissions
Agriculture	27,197	69%
Forestry and Land Use Change	8,117	21%
Energy	3,266	8%
Industrial Processes and other Products	165	0.4%
Wastes	561	1%
Total	39,306	

Source: UNFCCC (1994) GHG emission profiles for Non Annex I parties

Table 1 Nepal's greenhouse gas emissions by Sector (1994 data)

Figure 2 Nepal's Emissions within the Agriculture sector (UNFCCC 1992)



Opportunities for low emission development in Nepal

There are significant opportunities to engage with global climate finance around adaptation and mitigation through clean energy development and REDD+ approaches to forestry investment. However, Ellis et al (2013) point out that Nepal is highly dependent on hydropower, increasing its vulnerability to climate change. . Nepal is vulnerable to increases in emissions from further deforestation and aviation related emissions due to tourism.

Mitigation measures in agriculture include water management, livestock management (lower enteric fermentation feedstuffs), farm residue and chemical fertiliser management, better rice cultivars and improved cultivation techniques and practices.



SECTION 2

Climate Smart Agriculture– approach and options

2.1 Climate Smart Agriculture– approach and options

Climate-sensitive approaches to agriculture are essential given the implications of climate change for agriculture in Nepal. “Climate Smart” Agriculture approaches combine elements of:

- increasing food security / agricultural productivity
- increasing adaptation/resilience to climate change
- reducing greenhouse gas emissions in a sustainable way.

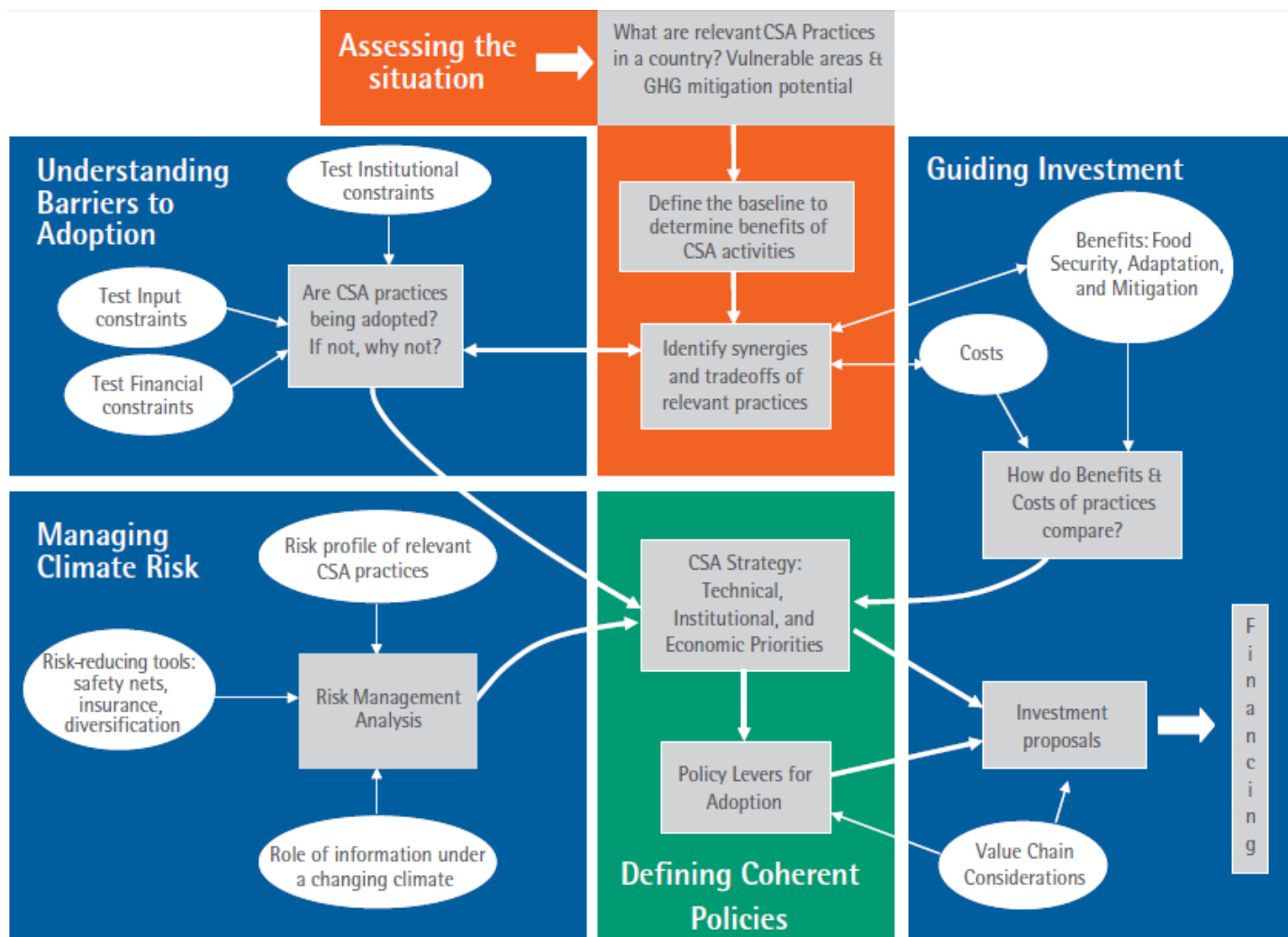
CSA technologies are largely not new and overlap with those of sustainable agriculture and sustainable intensification. But under the CSA approach they are evaluated for increases in productivity, resilience and mitigation.

The Climate Smart Agriculture sourcebook (FAO 2013) provides a series of components for climate smart agriculture:

1. Managing wider landscapes for climate smart agriculture systems;
2. Water, soil and energy management for resilience and mitigation;
3. Genetic resource conservation as part of resilience building;
4. Climate smart production systems: crops, livestock, forestry, fisheries;
5. Food value chains that are sustainable and inclusive;
6. Frameworks: local institutional structures; mainstreaming into national policy; and programmes; financing; capacity development; monitoring and evaluation.

Working out how to develop and implement effective sets of Climate Smart practices is an iterative process. Cattaneo et al. (2012) designed a framework for developing a Climate Smart Agriculture policy (see Figure 3). This model suggests a series of steps assessing the situation and identifying relevant CSA priorities, understanding barriers to adoption, managing climate risk, guiding investment decisions and finally developing policies on CSA that define technical, institutional and economic priorities. What is important to note is that this analysis may lead to recommendations that are unrelated to CSA technologies – and instead to do with commercialisation bottlenecks or access to rural credit for example. This is particularly relevant to Nepal’s situation, where the wider rural development constraints are significant and where CSA cannot be pursued solely at the ‘farm level’ .

Figure 3 Framework for assessing Climate Smart Agriculture approaches



Source: Cattaneo et al (2012)

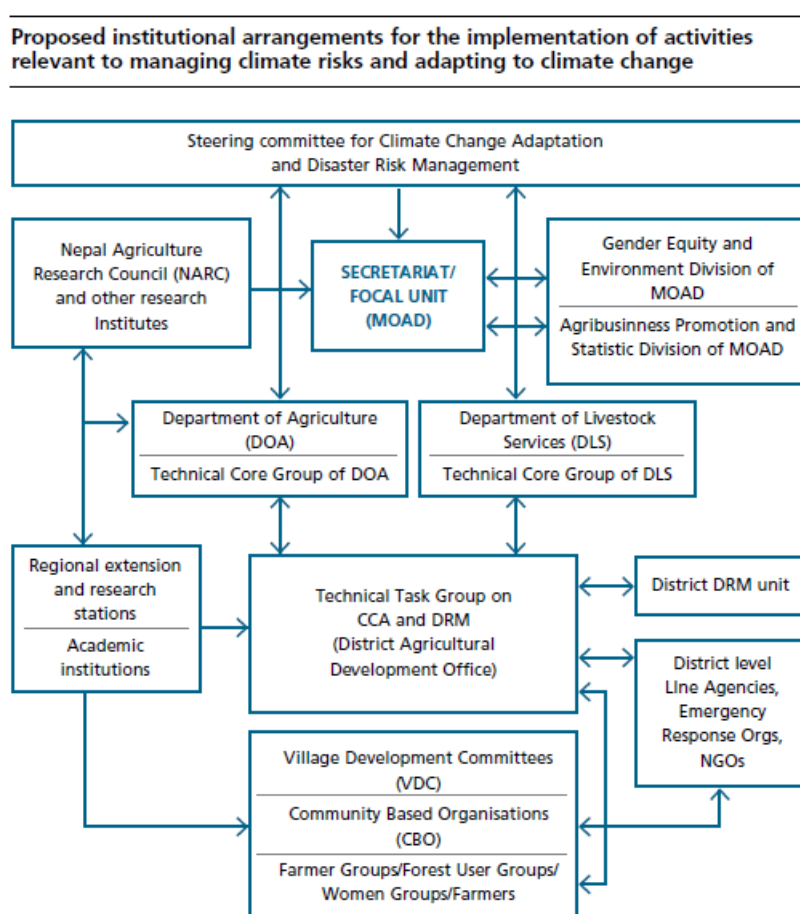
This framework demonstrates that:


1. **Micro level Climate Smart Agriculture activities need to be evaluated and prioritised.**
2. **Coordination of activities** is needed, including private sector (farmer adaptation), financial sector (credit for investment), government (policies) and research and extension (appropriate info on climate change).
3. **Increased investments are needed at farm level** to cover transition times to climate smart agriculture with financing incentives.
4. **Policy instruments such as** rural credit, input and output pricing, tenure, extension and safety net programmes will affect livelihoods and affect farmers' incentives to adapt to climate change.

2.2 Climate change policy relating to Agriculture in Nepal

Nepal's government is interested in poverty reduction and they recognise the potential of climate change to increase poverty and reduce development gains (MoE 2010). A set of institutional arrangements are proposed by the Ministry of Agriculture and Development to adapt to climate change that prioritise local levels of capacity and participation underneath national structures (see Figure 4) (GoN 2011, reported in Selvareju 2014).

Figure 4 Proposed institutional arrangements for the implementation of activities relevant to managing climate risks and adapting to climate change





Institutional arrangements on climate change in Nepal demonstrate that the country is addressing the matter at a structural institutional level. A number of planning bodies have been established (see Box 4). However, these require capacity building and continued support from government in order to be more effective.

Box 4 Institutional and Policy Arrangements on climate change in Nepal

- | | |
|-----|---|
| i | A Climate Change Council established under the Prime Minister. Established a Multi Stakeholder Climate Change Initiative Coordination Committee (est. 2010). |
| ii | Mainstreaming climate change into national level planning (e.g. Three Year Plans). |
| iii | Mainstreaming climate change into agriculture sector planning. Most of the agriculture policies do not yet explicitly discuss climate change, but this is an iterative process. |
| iv | Specific Climate Change Strategies/Policies. Nepal supported a two year process in developing their National Adaptation Plan of Action by 2010, followed by a series of context-specific Local Adaptation Plans of Action. LAPAs are especially important in Nepal because of its wide diversity of ecosystems, microclimates, agriculture and socio-economic differentiation (MoE 2010). Outside Nepal, the country is leading significant engagement with international negotiations on climate change at the UNFCCC including current leadership of the Least Developed Countries group (Chaired by Mr Prakash Mathema). |
| v | Nepal developed a Donor Compact on Climate Change to help coordinate actions on climate change in 2009. |



SECTION 3

Design and implementation

3.1 DFID Nepal programmes relating climate change and agriculture

DFID's investment in Nepal has spanned several decades, and remains strong. Its bilateral investments ranks highest of all donors in 2013/14 (£104.7m) with a total commitment of £311m between 2011-2015 (DFID 2014). One of six key pillars is adaptation to climate change, with nearly 17% of funding allocated to this in the last financial year.

DFID recognises that Nepal has struggled to fulfil its economic growth potential in recent years, with inequality remaining a major challenge (only 6% women in formal employment). DFID's bilateral support therefore focuses on wealth creation and supporting Nepal's economic take-off to assist the Government of Nepal's aspiration to achieve middle income status by 2022 (FCO 2014).

Key issues include political instability, reducing poverty and social exclusion, health and education, reducing disaster risks and improving lives of women and girls in Nepal. In order to reduce poverty and vulnerability, DFID recognises that it is imperative to create political stability and jobs, over a background of health, education and water provision as essential services. Value for money and demonstrable results are critical in the current aid climate, in addition to transparency (DFID 2013a; DFID 2013b).

Lessons from the recent long term [Impact review](#) of 40 years' development in the Koshi hills in Eastern Nepal include:

1. **DFID should focus towards the LONG TERM IMPACT:** Long term impact is not programme or sector specific – but is produced by cumulative and interconnected multiple programmes and factors beyond single programmes.
2. **DFID should focus on BENEFICIARY-DRIVEN NEEDS.** People are the most important factor: “The most effective development interventions are those that help individuals meet their desires for change, providing an enabling and supporting environment”.
3. **DFID should be aware of the WIDER IMPACT beyond specific sectors.** Development interventions were very sector specific, missing broader range of opportunities, impacts of migration and remittances, assuming desires to stay in agriculture and forestry that may not be true. Creating an ‘enabling environment’ is critical.

DFID is strongly committed to reducing the climate and disaster vulnerability of Nepal through mainstreaming climate change into existing programmes, and direct climate change projects.

Firstly, DFID has been integrating climate change across its wider portfolio of infrastructure, community development and local governance programmes (IDC 2015). DFID until recently used Climate and Environment Assessment screening to rate potential programmes and decide if they need further assessment and actions. For example, the Rural Access

Programme include technical capacity in road design to lower climate and earthquake related risk, and the most recent Rural Access Programme [Annual Review](#) (2014) reports against an indicator of “percentage of RAP infrastructure meeting standards for climate and disaster resilience”

Secondly, DFID has developed several climate change focussed projects (see Table 2) reflecting national concerns and priorities. Through this work, the resilience of two million people to climate change will be increased by 2013/2014 (DFID 2014). DFID is also using its forestry programme to lift poor and excluded people out of poverty (with a target of 570,000 by 2015) and contribute to lower carbon emission.

DFID Portfolio Project	Implementing Partner	Project value (£)	Results (to nearest 500k)
Nepal Climate Change Support Programme	Government of Nepal	11.8m (2010-2015)	3 million people with increased climate and disaster resilience; 360,000 with improved access to clean energy 537,000 increased climate and disaster resilience 660,000 benefitted 700,000 tons carbon storage annually
Multi-stakeholder Forestry Programme	SDC	20m (2010-2015)	
Livelihoods and Forestry Programme	CIDT	25.8m (2001-2012)	
Build Earthquake Resilience Programme	Red Cross and UNDP	21.9m (2012-2016)	

Table 2 DFID projects relating to climate change and agriculture

The private sector is involved in DFID climate change programmes through the solar power schemes, new cooking stoves and hydropower schemes in green growth (IDC 2015).


DFID has supported investment in a large hydropower scheme that it believes will be ‘transformative’ in the economy of Nepal (IDC 2015).

For further information see:

- Evidence from DFID Portfolio Review FY 2013-2014 [here](#)
- Report to House of Commons International Development Committee on DFID’s bilateral programme in Nepal 2014-2015 (March 2015) [here](#)

3.2 Climate Smart Initiatives in Nepal

Outside of DFID funding, Nepal has a number of high value climate resilience projects underway in the agriculture and forestry sector (see Annex 2) spanning crop diversification pilots, energy saving cook stoves, solar energy and rural electrification, forestry and carbon sequestration, with economic and livelihood benefits projected for several hundred thousand families. The Pilot Programme on Climate Resilience (PPCR) project focusses on the value chain sectors of rice, maize and sugarcane to boost this through private sector intervention and a climate smart village model approach fostered by Climate Change Agriculture and Food Security group (CCAFS). The USAID funded Initiative for Climate Change Adaptation project also focusses on market produce for farmers. The newly-launched BRACED project Anukulan will focus on a range of commercialisation opportunities together with conservation agriculture training. The International Fund for Agricultural Development (IFAD) has started a project in aimed at strengthening the adaptive capacity of farmers in the mid-Western Region. In addition to this, a number of NGOs have small rural development projects on



climate smart agriculture, such as SNV's 600 farmer project focussed on apple and off-season vegetable market value chain development.

3.3 Recommendations for DFID's further work on Climate Change and Agriculture in Nepal


“National ownership is key. Development partners should offer dialogue and options, not prescriptions.” (ADB, DFID and ILO 2009)

Adaptation to climate change is clearly a high priority for Nepal. Adaptation investments to 2030 have been costed for agriculture, water and hydrological disasters in a thorough assessment undertaken that examined impacts and economic costs of current climate variability, risks to current development practices and longer term impacts and economic costs of climate change (IDS-Nepal 2014). Nepal's concern and commitment to this area is clear.

Lessons from previous development work in the Koshi Hills suggest there should be a strong focus on what people's priorities are now in terms of needs in rural communities – supporting these leads to greater long term economic success.

DFID should continue to move forward these considerations within government and donors and multilaterals and private sector investors in alignment with national priorities and ownership. The main areas for focus include building capacity, scaling up adaptation measures, moving towards adaptation investment plans and starting initial programmes for critical early steps. We group these in three broad areas: i) achieving sustainable, resilient food security in Nepal, ii) coordinating and encouraging finance for CSA and iii) region-specific information and economic analysis of options.

1. **Nepal progresses towards sustainable food security, adapted to climate change**
 - a) **DFID should focus on increasing food availability through economic growth and investments in tackling the major structural impediments to rural development in agriculture** – Nepal's focus on economic growth is essential for the future of the country and its growing population. Nepal's current economic reliance on both international remittances and external aid provides significant opportunities for investment in shaping opportunities towards higher productivity, higher quality agricultural produce that will meet Nepal and international demand.
 - b) **DFID supports initiatives that will strengthen key needs in the country for development and growth**, including political stability, inclusive growth, the needs of women in particular. DFID should also consider how major constraints such as energy and infrastructure might impact regions of their focus where their programmes work.
 - c) **DFID becomes a Food Value Chain champion on Climate Smart Agriculture. This innovative approach goes beyond the farm level to include the whole food value chain.** Given DFID's strong interest in supporting entrepreneurial inclusive growth potential, involving others up the food chain is a logical step. These include agro processing, financing and credit institutions, and considerations of improving climate resilience and post-harvest food waste loss reduction.



d) Capacity and sharing of information is very important. Whilst there are some sites which collate information, these are outdated. Nepal's Ministry of Science, Technology and the Environment (MoSTE) is low capacity and has many projects. DFID can support proper sharing of information and coordination of project activities.

- **Recommendation 1: DFID considers developing a more central role for work on climate smart agriculture as part of its new operational plan 2016-2020 as part of its portfolio. DFID continues to screens its portfolio for coherence with climate change adaptation and disaster risk reduction** on an ongoing basis and for all new projects, keeping low carbon where possible
- **Recommendation 2: DFID supports initiatives that will strengthen key needs in the country for development and growth through its transformational change focus**, including political stability, inclusive growth, and the needs of women in particular. These support the broader economic development and opportunities for the region, providing enabling conditions to 'step up' or 'step out' of agriculture
- **Recommendation 3: DFID supports (and potentially plays a coordinating role) in Climate Smart Agriculture initiatives, developing Selvaireju's (2014) recommendations** in the country and information gathering around impacts on agriculture at farm gate level through the food value chain to distribution, highlighting potential for decreasing waste, increasing value through pro-poor initiatives such as farmer agro-processing and improved quality of produce.
- **Recommendation 4: DFID supports facilitates sharing of knowledge amongst ADB, World Bank, FAO, IFAD and leading NGOs on climate smart agriculture and related forestry activities.**

2. Improving coordination in-country and assistance with Accessing Finance for CSA

DFID supports significant investments in both resilience and agriculture and poverty reduction in Nepal. Along with other donors, DFID recognises that rural poor have different levels of ability to engage in agriculture – a mix of social protection programmes as well as growth-focussed private sector stimulation in the agricultural sector will be appropriate.

- **Recommendation 5: DFID should report on access to development and climate finance through the international channels and bilateral donors and private sector (mitigation and adaptation)** especially around major investments planned e.g. in hydropower sector / infrastructure, both of which have been repeatedly identified as constraints to growth, and also around forestry initiatives
- **Recommendation 6: DFID Nepal should monitor and support Nepal's engagement with international negotiations** especially as LDC Chair to ensure that the greatest efforts are achieved in terms of securing a binding agreement towards a 2°C or 1.5°C cap in global average annual temperature increase by 2100. Beyond this level, adaptation costs and impacts for Nepal become extremely concerning.

- **Recommendation 7: DFID should seek** opportunities for commercialisation of climate-resilient agriculture through the value chain with relevant partners e.g. IFAD's High Value Agriculture Project in Hill and Mountain Areas.

3. **Nepal develops region specific programming and socio-economic analysis of rural adaptation options for climate change**

Evidence suggests that adaptation options for farmers in Nepal need careful tailoring to diverse environmental, economic, social and institutional contexts within different regions. Local adaptation plans are underway. Pilots underway could be scaled up, but it may be more appropriate to scale up appropriate local processes for identification of best approaches to training, capacity building and developing best responses to climate change. Selvaraju (2014) detailed a range of adaptation options for agriculture and livestock, building on the NAPA (see Annex 1). The Second National Communication on Climate Change should provide further analysis.

- **Recommendation 8: DFID collates, or supports collation of existing and new evidence that is region-specific**, and supports it being made publicly available through existing channels such as Nepal's Climate and Development Portal for development planners and investment planners.
- **Recommendation 9: The next research steps suggested in collaboration with government** include a social and economic cost-benefit analysis on climate change and agriculture programme to develop, a feasibility analysis, financial support analysis, and implementation coordination and support. Key limitations of government investment levels and extension reach to remote regions need to be considered as integral to any feasible approach.



References

Recommended resources


1. The Ministry of Science, Technology and Environment host Nepal's Climate Change and Development Portal hosts a library of publications about Nepal on Climate Change, online at <http://climatenepal.org.np/main/?p=research&sp=onlinelibrary>.
2. FAO (2013) Climate Smart Agriculture Sourcebook, FAO, Rome.
<http://www.fao.org/docrep/018/i3325e/i3325e.pdf>. Accessed July 2014.


DFID documentation

- DFID (2013a) Summary of DFID's work in Nepal 2011-2015, June 2013. Department for International Development (2pp).
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/209837/Nepal-summary1.pdf
- DFID (2013b) Operational Plan 2011-2013 DFID Nepal. June 2013 Update, Department for International Development.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/208964/Nepal.pdf
- FCO (2014) Statement by Hugo Swire MP to Press conference in Kathmandu, June 2013
<https://www.gov.uk/government/news/statement-by-hugo-swire-mp-to-a-press-conference-in-kathmandu>
- DFID (2014) DFID Nepal Portfolio Review 2013/2014. Department for International Development.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/325400/DFID_Nepal_Portfolio_Review_FY_2013-14.pdf

References

- ADB, DFID and ILO (2009) Nepal: Critical Development Constraints, Asian Development Bank. http://www.ilo.org/kathmandu/whatwedo/publications/WCMS_119188/lang--en/index.htm.
- AR5 (2014) IPCC Fifth Assessment Report, Working Group II Impacts and Adaptations Chapter 22: Africa. http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap22_FGDall.pdf Accessed August 2014.
- Basnett, Y., Henley, G., Howell, J., Jones, H., Lemma, A. and P. R. Pandey (2014) Structural Economic Transformation in Nepal: A Diagnostic study submitted to DFID Nepal. June 2014, Overseas Development Institute.
<http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9019.pdf>.
- Cattaneo, A., Lipper, L., Afshaw, S., Arslan, A., Branca, G., Mann, W. and N. McCarthy (2012) Developing a climate-smart agriculture strategy at the country level: lessons from recent experience <http://www.fao.org/docrep/016/ap401e/ap401e.pdf>.
- CDKN (2014) What's in it for South Asia? – The IPCC's Fifth Assessment Report, Executive Summary <http://cdkn.org/wp-content/uploads/2014/04/CDKN-IPCC-Whats-in-it-for-South-Asia-AR5.pdf>.
- Ellis, K. Lemma, A. and Scott, A. with A. Subedi and R. Adhikari (2013) Low Carbon Competitiveness in Nepal. Overseas Development Institute Policy Brief.
<http://www.odi.org/publications/7866-low-carbon-competitiveness-nepal-energy-tourism-manufacturing-climate-change-natural-resources>.

- 
- FAO (2012) Developing a Climate Smart Agriculture Strategy at the Country Level: Lessons from Recent Experience, FAO, <http://www.fao.org/docrep/016/ap401e/ap401e.pdf>.
- FAO (2013) Climate Smart Agriculture Sourcebook, FAO, Rome. <http://www.fao.org/docrep/018/i3325e/i3325e.pdf>. Accessed July 2014.
- FAO (n.d.) What is Conservation Agriculture <http://www.fao.org/ag/ca/1a.html> Accessed August 2014.
- FCO (2014) Overseas Business Risk, Nepal, Foreign and Commonwealth Office, UK <https://www.gov.uk/government/publications/overseas-business-risk-nepal/overseas-business-risk-nepal>.
- Feed the Future (2014) The US Government's Global Hunger and Food Security Initiative www.feedthefuture.gov/country/Nepal.
- GoN (2010) Nepal Agriculture and Food Security Country Investment Plan. Government of Nepal. <http://www.gafspfund.org/sites/gafspfund.org/files/Documents/Nepal%20of%209%20Country%20Investment%20Plan.pdf>.
- Hijioka, Y., E. Lin, J.J. Pereira, R.T. Corlett, X. Cui, G.E. Insarov, R.D. Lasco, E. Lindgren, and A. Surjan, (2014): Asia. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1327-1370.
- IDS-Nepal, PAC and GCAP (2014) Economic Impact Assessment of Climate Change in Key Sectors in Nepal. IDS-Nepal, Kathmandu, Nepal. <http://www.idsnepal.org/projects/14-economic-impact-assessment-of-climate-change-in-key-sectors-in-nepal.html>.
- IFAD (2013) Country Strategic Opportunities Programme Nepal. International Fund for Agriculture and Development. <http://operations.ifad.org/documents/654016/e98f365b-705f-416f-85ac-ef6d85a87b2f>.
- Joshi, N. P., Maharjan, K. L. and Piya, L. (2011) Effect of Climate Variables on yield of Major Food Crops in Nepal – A Times Series Analysis. MPRA Paper, 35379. University Library of Munich <https://ideas.repec.org/p/prapa/mprapa/35379.html>.
- Lucas, S. (2010) Kathmandu to Cancun: reality and rhetoric, DFID bloggers 10 December 2010 <https://dfid.blog.gov.uk/2010/12/10/kathmandu-to-cancun-reality-and-rhetoric/>.
- Knight, K. (2014) Analysis: Finding the roots of Nepal's rural mountain poverty. IRIN Humanitarian News and Analysis. <http://www.irinnews.org/report/99624/analysis-finding-the-roots-of-nepal-s-rural-mountain-poverty>.
- LDC (2014) LDC Group at UN Climate Change Negotiations: Least Developed Countries set bar for ambitious climate action <https://ldclimate.wordpress.com/2014/10/20/press-release-least-developed-countries-set-bar-for-ambitious-climate-action/#more-1089>.
- Malla, G. (2008) Climate Change and its Impact on Nepalese Agriculture, Journal of Agriculture and Environment (9) <http://www.nepjol.info/index.php/AEJ/article/view/2119>.
- McSweeney, C., New, M. & Lizcano, G. (2010) UNDP Climate Change Country Profiles: Nepal. Available: <http://country-profiles.geog.ox.ac.uk/> [Accessed 10 May 2013].
- MoE (2010) National Adaptation Programme of Action to Climate Change: Nepal, Ministry of Environment, Government of Nepal. http://unfccc.int/adaptation/workstreams/national_adaptation_programmes_of_action/items/4585.php.
- ND-GAIN (2015) Global Adaptation Index Nepal Climate Vulnerability <http://index.gain.org/country/nepal>
- New Agriculturalist (2009) Country Profile: Nepal <http://www.new-ag.info/en/country/profile.php?a=935>.



Rural Poverty Portal (2013) Rural Poverty in Nepal.

<http://www.ruralpovertyportal.org/country/home/tags/nepal>.

Selvaraju, R. (2014) Managing climate risks and adapting to climate change in the agriculture sector in Nepal. Food and Agriculture Organisation, Italy.

<http://www.fao.org/publications/card/en/c/bf0b71f3-18f8-58a3-8975-2e8ad115b245/>.

SOFI (2014) The State of Food Insecurity in the World: strengthening the enabling environment for food security and nutrition, FAO, IFAD and WFP.

<http://www.fao.org/3/a-i4030e.pdf>.

UNFCCC (1994) Emissions Summary for Nepal

http://unfccc.int/files/ghg_data/ghg_data_unfccc/ghg_profiles/application/pdf/npl_ghg_profile.pdf.

Wikipedia (2014) Food Security http://en.wikipedia.org/wiki/Food_security Accessed August 2014.

World Bank (2014) GDP Growth Annual Percentage Country Data Table.

<http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG/countries/MW-ZF?display=default>.

Annex 1 Priority Activities to enhance adaptation in the agriculture sector

AREA	PRIORITY ACTIVITIES
Irrigation and water management	<ul style="list-style-type: none"> Increased irrigation facilities through the promotion of shallow tube wells, water collection/recycling and rainwater harvesting Promotion of low-cost, non-conventional irrigation technology, including drip/sprinkle irrigation and overhead water tank
Resource conservation	<ul style="list-style-type: none"> Promotion of resource conservation technologies, including minimum tillage, seed priming, crop mixtures, double transplanting of rice and widely adapted crop species with low nutrient requirements Promotion of organic agricultural practices, with special focus on biopesticides, organic fertilizers, crop nutrients and pest management Improved collection and utilization of rainwater in pasture and rangeland areas
Strengthening agriculture service systems	<ul style="list-style-type: none"> Introduction of crop seeds, seedlings, saplings and fingerlings adaptable to local conditions Promotion of a community seed bank for cereal, vegetable, forage, fodder and agroforestry species Promotion of crop varieties for vulnerable areas, adaptable to climate stresses and suitable for supplying large quantities of food
Infrastructure development for risk reduction and effective response	<ul style="list-style-type: none"> Infrastructure (such as plastic or greenhouses for off-season vegetables) and marketing development for agro-based microenterprise development Stockpiling of agricultural inputs and emergency food supplies through establishment of stores (cold stores and zero energy storage) and decentralized food buffer stocks Embankments and plantations in riverbank areas Slope agriculture land technology (SALT) for soil conservation
Policy development, mainstreaming	<ul style="list-style-type: none"> Agricultural development policy review in terms of agricultural finance and inputs, small-scale irrigation, seed banks, food storage and buffer stocks Promotion of resource-efficient technologies (ensuring high income) for vegetable, fruit and flower production Promotion of pocket area production to back up seed banks and food buffer stocks Diversification of diets using nutritionally rich cultivated and wild food crop species of local origin Strengthening of marketing institutions and networks at strategic centres in different ecological regions (Koshi, Gandak and Karnali River basin) Enacting of pro-farmer land-use policy and programmes Protection of local community rights to natural resources and indigenous knowledge, practices, skills and innovations
Livestock and animal husbandry	<ul style="list-style-type: none"> Improved performance of piggeries with emphasis on housing, mortality and ration management Promotion of the community approach for innovative pasture and rangeland management using locally adapted fodder and forage species Improved animal housing, nutrition (based on local feed, fodder and forage supply/ production), disease and parasite management Improvement of indigenous breeds of pigs, poultry, goats and sheep Studies of climate change impacts on farm animals Promotion of poultry, dairy, goat and piggery-based enterprises linked to urban markets





AREA	PRIORITY ACTIVITIES
Fishery and aquaculture	<ul style="list-style-type: none"> • Conservation of fish species, especially in rivers used for hydropower and irrigation (improved fish migration) • Public-private partnerships in fishery development, especially fingerling supply in pond culture • Improved carrying capacity of natural water bodies (rivers, lakes, reservoirs and other wetlands) for sustainable community fish production and marketing • Promotion of poly-culture and integrated pond culture with low-cost and high-productivity technology • Studies of climate change impacts on fishery • Strengthened livelihoods of ethnic minorities dependent on fishing • Integration of ecotourism and sport fishing into sustainable community development
Awareness raising and local capacity building	<ul style="list-style-type: none"> • Awareness raising campaign on climate change adaptation • Exposure visits, vocational training and Farmer Field Schools to enhance adaptive capacity of local organizations and communities
Research and Development	<ul style="list-style-type: none"> • Strengthened climate change adaptation research and education • Promotion of development of new crop varieties and livestock breeds capable of withstanding emerging climate stresses
Impact assessment and early warning systems	<ul style="list-style-type: none"> • Establishment/strengthening of agro-meteorological stations representing various agricultural systems • Establishment of early warning system based on recent scientific developments and local knowledge and practices
Biodiversity conservation and management	<ul style="list-style-type: none"> • Improvement of climate-resilient agricultural biodiversity • Indigenous knowledge and innovations • On-farm management of agricultural biodiversity

Source: Selvaraju (2014)



Annex 2 Climate Smart Agriculture Initiatives in Nepal – Development/Food Security, Mitigation and Adaptation

Evidence is patchy – these are some of the main projects

Project name and weblink (if any)	Sectoral focus	Duration and value	Location type (place)	Implementing Partner Type (name)	Funding source(s)	Community beneficiaries
Nepal Climate Change Support Programme (NCCSP) to implement the climate change policy and NAPA/ LAPAs Integrated management of agriculture, water, forest and biodiversity DFID Annual Review 2013 for the project National Rural and Renewable Energy Programme http://nepal.um.dk/en/danida-en/programmes/rural-energy/	Various including agriculture: LAPAs in 69 Village Development Committees Rural energy: cooking stoves mini hydropower, , solar power, biogas, electrification	Mid 2012-(4 years) £17.7m 2012-2017 USD 170m	Mid and far Western Districts Terai plains	Through government Alternative Energy Promotion Centre Practical Action Consulting, CCAFS South Asia	DFID/EU/UNDP Various donors IFC International Finance Corporation, World Bank Group boosting private sector growth and adapt to climate change impacts	100,000 with reduced vulnerability to climate change by 2015 600k solar home systems, 475k cooking stoves, 25MW hydro power, 150k community households electrified 15000 farmers; 15 lead trainers and 5 lead firms in respective crop sectors
Promoting Climate Resilient Agriculture Pilot Programme for Climate Resilience (PPCR), Nepal https://ccafs.cgiar.org/blog/engaging-private-sector-climate-smart-future-nepal#.VWuP-M9Viko http://climatepolicyinitiative.org/wp-content/uploads/2013/12/SGG-Case-Study-Pilot-Program-for-Climate-Resilience-in-Nepal.pdf	Agriculture: Rice, maize, sugarcane sectors – link to markets using climate smart village model	2013-2017				
USAID Resilience Programme – community resilience, early warning flooding, science and technology for resilience Initiative for Climate Change Adaptation Project http://www.usaid.gov/nepal/fact-sheets/initiative-climate-change-adaptation-icca-project	Rural areas Non timber forest products, vegetables for market, coffee, essential oils	2014- 2012-2017 USD 2 million		International Development Enterprises and RIMS-Nepal IFAD	USAID IFAD; DSF	100,000 people 100,000 people (20k households)
IFAD Adaptation for Smallholders in Hilly Areas (ASHA)	Community development	2014-2010 USD37.6m				100,000 households



Project name and weblink (if any)	Sectoral focus	Duration and value	Location type (place)	Implementing Partner Type (name)	Funding source(s)	Community beneficiaries
http://operations.ifad.org/web/ifad/operations/country/project/tags/nepal/1723/project_overview Anukulan: Driving small farmer investment in climate smart technologies (BRACED) Some early details available here: http://www.ide-uk.org/anukulan/	Agricultural production Environmental protection Climate change and disaster risk reduction harmonisation; commercialisation of smallholder agriculture; conservation agriculture; integrated pest management and other adaptation technologies Environment and energy; mountain ecosystems	total Jan 2015 – Jan 2018 approx. £5m	Bardiya, Dadeldhura, Doti, Kailali, Kanchanpur and Surkhet districts in the far and mid-west regions of Nepal	iDE, Rupantaran, SAPPROS, RIMS, IWMI, NTAG (and others)	DFID	500,000
Ecosystems Based Adaptation Programme Resilience of Nepalese communities to Climate Change – http://www.ebaflagship.org/ecosystems/mountains/nepal/340-usd-3-3-million-grant-to-offset-climate-change-effects-in-nepal	Environment and energy; mountain ecosystems	2012-2015 USD3.3m	Western Nepal	UNDP/UNEP/IUCN	German International Climate Initiative	
Further Nepal government PPCR initiatives: <i>Building climate resilience of watersheds in mountain ecoregions: freshwater resource access SPCR 1</i> <i>Building resilience to climate-related hazards SPCR 2</i> <i>Mainstreaming Climate change risk management in development SPCR 3</i> SNV Climate Smart Agriculture Programme	various Value chains apples and off- season vegetables		Mid Western Development Region	SNV		600 farmers by end 2014



Annex 3 DFID's 2014 revision of Nepal Country Strategy: excerpt on strategic focus on Climate Change

Climate Change – there are four key areas outlined in this revised strategy

1. Through our Climate Change Support Programme, **we will support the National Adaptation Plan of Action** on climate change which will help millions of poor and vulnerable people adapt to climate change impacts in **agriculture, water management and disaster risk reduction**.
2. **We will work with other donors in the forestry sector** to support a nationally harmonised, but decentralised, approach in forestry that benefits the poor and socially excluded groups, reverses deforestation and tackles climate change impacts. The forestry programme will bring thousands of hectares of forest area under improved management by community user groups and will create thousands of jobs in rural areas for poor and socially excluded people.
3. **We will ensure DFID Nepal is climate change aware and all programmes are as climate resilient and low carbon as possible.**
4. Through our Disaster Resilience Programme, **we will strengthen national systems and capacity for disaster risk management** and response, increase community based readiness and improve preparedness for national and international emergency responses. Using International Climate Fund (ICF) funding we will further the integration of disaster resilience into national and local planning systems and processes. In addition, we will also establish humanitarian staging areas in strategic locations in the Kathmandu Valley to facilitate post disaster relief operations and begin construction to earthquake proof at least two of Nepal's major hospitals.

DFID Nepal state: “our work on climate change and disaster risk reduction will involve developing indicators to track impact and value for money.” (p.13)

Planned Programme Spend

Pillar/Strategic	2011/12		2012/13		2013/14		2014/15		2015/16 (provisional*)
	Resource £'000	Capital £'000	Resource £'000	Capital £'000	Resource £'000	Capital £'000	Resource £'000	Capital £'000	Total Resource and Capital £000
Climate Change	7,008		8,723	750	16,819	828	19,414	732	

(p. 11)

Source: DFID Nepal (2014) Nepal Country Strategy (Revision)

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/389073/Nepal.pdf