FAO/GLOBAL ENVIRONMENT FACILITY
PROJECT DOCUMENT

Project title: Reducing vulnerability and increasing adaptive capacity to respond to impacts of climate change and variability for sustainable livelihoods in agriculture sector in Nepal

Project Symbol: GCP/NEP/071/LDF

Recipient Country: Nepal	**Resource Partner:** Global Environment Facility (GEF)
FAO Project ID: 616181	**GEF Project ID:** 5111

Government/other counterparts: Ministry of Agricultural Development (MOAD), Department of Agriculture (DOA), Department of Livestock Services (DLS), Nepal Agricultural Research Council (NARC) and Department of Hydrology and Meteorology (DHM)

Expected OED (Starting Date): January 2015	Expected NTE (End date): December 2018

Contribution to FAO's Strategic Framework:	• Strategic objective/Organizational Result: SO2: Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner. Organizational Outcomes 1 (output 1.1 and 1.2) • Country Programming Framework Outcome: 4.3 (CLIMATE CHANGE): Institutional and technical capacities for adaptation to climate change in agriculture strengthened and adaptive capacity of vulnerable communities enhanced.

GEF Focal Area/LDCF/SCCF: Least Developed Country Fund

GEF/LDCF/SCCF Strategic Objectives:

- CCA1: Reducing vulnerability – Reduce vulnerability to the adverse impacts of climate change, including variability, at local, national, regional and global level
- CCA2: Increasing Adaptive Capacity: Increase adaptive capacity to respond to the impacts of climate change, including variability, at local, national, regional and global level
- CCA3: Adaptation Technology Transfer: Promote transfer and adoption of adaptation technology

Environment impact assessment Category: A B C √

Financing Plan:	
GEF/LDCF/SCCF allocation	USD 2,689,498
Co-financing	
FAO/UTF	USD 8,620,000
FAO/MTF	USD 1,170,000
Government	USD 3,200,000
Sub-total Co-Financing:	USD 12,990,000

EXECUTIVE SUMMARY

Nepal is one of the most vulnerable countries to climate change impacts. Climate and its variability is already affecting Nepal's agriculture sector. The climate related hazards like floods, drought, hailstorms, heat and cold waves; and pests and diseases, soil erosion, deforestation, desertification are recurring and pose severe threats to the sector. The poor and marginalized groups of people residing in the rural areas are usually hit hardest by the consequences of climate change and increasing frequency of natural hazards. Increasing trends of extreme climate events and natural disasters due to climate change could undermine future food security. Although the Government of Nepal has constantly responded to climate risks, a renewed focus on reducing vulnerability and increasing adaptive capacity to respond to impacts of climate change and variability is crucially needed to save agricultural livelihoods.

In response to the request from the Government of Nepal, FAO has prepared the proposal aimed at strengthening institutional and technical capacities for reducing vulnerability and promoting climate-resilient practices, strategies and plans for effectively responding to the impacts of climate change and variability in agriculture sector. The project components include: (1) Strengthening of technical and institutional capacities and integrating adaptation into food and agriculture policies, strategies and plans; (2) Assessment, monitoring and providing advance early warning information on vulnerabilities,risks of climate change and agrometeorological forecasts to assist better adaptation planning; (3) Improving awareness, knowledge and communication on climate impacts and adaptation; (4) Prioritizing and implementing local investment for strengthened livelihoods and sources of income and transfer of relevant adaptation technology for reducing climate risks in agriculture.

The LDCF project focuses four districts in two development regions: Eastern Development Region (Udayapur and Siraha) and Western Development Region (Argakhanchi and Kapilbastu). In general, the focus districts represent two eco-regions - mid-hills (Udayapur and Argakhanchi) and terai (Siraha, Kapilbastu). The project will employ a participatory learning and doing approach through farmer field schools at the local level to reduce the vulnerability and promote adaptive capacity to effectively respond to climate change impacts. The direct beneficiaries of the project are 120 farmer groups (~3000 farmers) in 24 selected Village Development Committees (VDC). The national level staff of MOAD, Department of Agriculture (DOA) and Department of Livestock Services (DLS) and district staff from DOA, DLS, Local Development, Department of Irrigation and Non-governmental Organizations (NGO)/Community Based Organizations (CBO) is the second level of beneficiaries through capacity development programmes.

The project contributes to national priorities under National Adaptation Programme of Action (NAPA), National Agriculture Sector Development Priority (NASDP) and the Priority Framework of Action (2011 – 2020) (PFA) on Climate Change Adaptation and Disaster Risk Management of the Ministry of Agricultural Development (MOAD) and recently developed Agriculture Development Strategy (ADS) 2013. The project focuses the key elements of GEF LDCF objective CCA-1 on reducing vulnerability to adverse impacts of climate change and objective CCA-2 on increasing adaptive capacity to respond to the impacts of climate change and CCA-3 on adaptation technology transfer. The project is consistent with GEF Agency's (FAO) Strategic Objective 2 (SO2): Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner, and Country Programming Framework (CPF) Outcome: 4.3 (climate change): Institutional and technical capacities for adaptation to climate change in agriculture strengthened and adaptive capacity of vulnerable communities enhanced.

The project will be implemented for a period of 48 months (4 years) with a total budget of USD 15,679,498 of which USD 2,689,498 with GEF LDCF resources.

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SECTION 1. RELEVANCE (STRATEGIC FIT AND RESULTS ORIENTATION)

1.1 GENERAL CONTEXT

A. General development context related to the project

Nepal has gone through 50 years of planned development having implemented 12 periodic plans in this period. Yet, many aspects of economic and social sectors remain backward. Many factors can be listed for the poor development record. These include not only the high costs of developing physical and social infrastructures but also restrictive political environment until 1991. The country encountered a decade of armed conflict and prolonged political instability that continued to disrupt the development process. New hopes for a sustainable and inclusive development emerged after the end of the armed conflict in 2006. It involved the country in the process of formulating a new Constitution through a Constituent Assembly elected in 2008.

However, the country could not produce it within the stipulated time and finally the Assembly was dissolved in 2012. As a result, the country is running now under the Interim Constitution. Second Constituent Assembly was elected in 2013 and now is in the process of developing a new constitution. Given the need for development, the country is however reached to a consensus that Nepal needs to address structural problems of the economy such as low productivity, social backwardness, inequitable access to productive resources and means, and lack of good governance.

The country ranks 193 out of 210 in terms of Gross National Income per capita adjusted for purchasing power. More than 70 percent of the population lives in less than USD 2 per day. With about 35 percent share in the GDP and close to 70 percent in employment, agricultural remains the most important sector for economic growth as well as poverty reduction, food security and rural development. Nepal's GDP growth rates during the past decade have fluctuated between 3 to 5 percent per year. Likewise, during the same period, agricultural GDP growth rates have been in the 2-3 percent per annum with a hopeful spur of 4.7 in the year 2013/14.

Agricultural GDP growth rate averaged 3.2 percent during 2004/13, a relatively better growth compared to other countries in the region. Due to weather, agricultural GDP fluctuates considerably. Within agriculture, the growth rate in cereal production has been lower relative to non-cereal agriculture. The structure of the Nepali economy has also been changing. Thus, while the share of the agricultural GDP fell from 48 percent in 1990/91 to 35percent in 2013/14, that of the service sector jumped from 35 to 52 percent in the same period. The rapid growth of the services sector has been due to expansions in finance, housing, marketing, health and education. A worrisome development has been the contraction of the industrial sector, from 18 percent to 14 percent in these periods. As a result, the generation of productive employment has suffered considerably while income inequality and social exclusion has increased.

Compared with many other developing countries, Nepal made good progress in these areas. Poverty rate has fallen markedly – the number of people living below the national poverty line fell from 42 percent in 1996 to 31 percent in 2003 and to 24 percent in 2013. The FAO food balance data show that between 1990-92 and 2005-07, daily food energy supply increased from about 2 190 to 2 350 kcal/person/day, protein from 55 to 60 grams/person/day and fat from 34 to 40 gm/person/day. As a result, the proportion of the undernourished population fell from 21 to 16 percent in this period, while the proportion of underweight children declined from 43 percent in 1996 to 39 percent in 2006.

These levels of poverty and other deprivations are considered high, both in absolute and relative sense. The country suffers from structural problems such as economic disparities and inequities in access to productive resources and means, with huge disparities between the rural and urban areas. The poverty

rate is particularly high in the Far-Western Development region (46 percent) and in the Mountain belt (42 percent). Similar disparities exist in malnutrition and other social conditions. In 2011, 27 of the 75 districts were found food deficit.

The production of food crops has grown at a rate of 2.3 percent per annum during the period 2001/02-2010/11, indicating a marginal positive growth in per capita terms. Production growth has exceeded area growth, implying that yield is also a contributing factor. Production growth rates of wheat (4.21 percent) and maize (3.44 percent) are higher than of paddy (about 1 percent). The yields for major cereals in Nepal are comparable to other South Asian countries and especially the neighbouring states in India. Despite this, annual per capita food availability (edible form) declined from 198kg during 1990/91 to 186 kg in 2008/09. Sustaining production performance requires attention to several challenges on the inputs as well outputs.

Nepalese agriculture is heavily dependent on rainfall, with only 54 percent of the cultivated land irrigated and not all irrigated land having access to year-round irrigation. About 44 percent of paddy and about 37 percent of wheat is cultivated in rain-fed conditions. The average fertilizer use is around 57 kg per hectare/year, much lower than in most other countries. Lack of quality seeds has been a perennial problem. On the output side, prices are considered low and variable, with poor marketing and other infrastructure. Private sector participation is low on transport, agro-storage and agro-processing. Lately, agriculture has also been suffering from labour shortage with large outflows of working age males to urban areas, India and overseas for jobs.

As a result of the large and growing population over a small and fragile land mass, Nepal's natural resources are being over-exploited beyond their retaining and regenerative capacity. The contributing factors are well known and include: i) unsustainable land use practices; ii) unsustainable exploitation of bio-diversity; (iii) deteriorating watershed services; and (iv) increasing conversion of forest land to other uses. Climate change is the new addition. The deterioration of the watersheds is aggravated by improper land-use practices, particularly in fragile landscapes, overexploitation of water, land and forest resources, including deforestation and forest degradation. Lack of alternatives sources of income for food security has led to the over-dependency on the use of natural resources.

Besides pastureland degradation and poor agricultural practices, the removal of forest cover has also resulted in accelerated soil erosion from the hill slopes and excessive run-off, which in turn contributes to the loss of productive top soil from the cultivated areas, lowering soil fertility and decreasing crop yields whilst causing siltation problems in downstream areas. Nepal is rich in biodiversity – ranking 25th in biodiversity scale with about 118 ecosystems, 75 vegetation types and 35 forest types. However, losing out on biodiversity conservation is a serious concern in the country. It is one of the reasons for the Nepal Agro Biodiversity Policy 2007 to consider agro-biodiversity as a backbone for sustainable development of agriculture, food security and poverty alleviation.

The above succinct account of the current situation provides a glimpse of the myriad challenges that Nepal faces in the area of food security, agriculture and natural resources. The list of individual challenges and gaps can be very long. For example, the *National Agriculture Sector Development Priority 2010* (NASDP), the latest diagnostics on agricultural development challenges, lists 21 issues and challenges. These cover a wide range of areas, e.g. low productivity and gaps across regions and groups of farmers, low investment, poor governance, food safety and nutrition, degrading natural resource base, and poor policy/programme capability. Most of these gaps are well known and common to many other developing countries, especially to the LDCs. What may be unique for Nepal could be some of the challenges due to the rugged and fragile terrain, high population density, being landlocked and low levels of social and physical infrastructures.

The low-input, low-productivity regime characterizing Nepal's current agriculture also implies significant opportunities for rapid growth. There are many areas where low-cost solutions do exist to the current problems. For example, while developing new farm technologies can be expensive, productivity gaps across regions and among farmer groups can be narrowed more quickly based on

available technologies and extension services. The same is the case for organizing marginal and small farmers into groups or cooperatives. In many cases, low-cost interventions that effectively focus on removing the existing constraints and by creating an enabling environment in which the key actors in the business — farmers, agro-entrepreneurs, traders, fisher folks, and rural youth — tap the opportunities to enhance food production incomes.

There are also many successful examples of things that have worked well, and what is required is the programmes to upscale them. For example, Nepal's Small Farmers Development Programme as a way to create viable economic entities was a success in late 1980s and early 1990s. Nepal's Community Forestry Programme is often cited around the world as a best practice in this area. In many such cases, what went wrong was governance and lack of guidance and support from the state bodies.

Nepal's location between fast-growing India and China could provide immense opportunity for rapid growth. Nepal also enjoys unlimited access to the India market under the free trade agreement. Nepal also has ample water resources which are yet to be harnessed. Nepal's rich biodiversity, including medicinal plants, could be an important source of wealth. So, all in all, while the characterization of Nepal's current state of agriculture may indicate a sad state, the country has many opportunities lying to be tapped.

B. Climate change vulnerability and problems the project will address

Nepal is a land-locked country situated in the central part of the Himalayas. This comprises of high mountains, mid-hills, Siwalik (the Churia range), and the Terai (Plains) (Figure 1). Each of the agro-eco regions has climatic characteristics varying from tropical to alpine conditions within a lateral span of less than 200km. Nepal's climate is influenced by the Himalayan mountain range and the South Asian monsoon. The climate is characterized into four distinct seasons: pre-monsoon (Mar-May), monsoon (Jun-Sep), post-monsoon (Oct-Nov) and winter (Dec-Feb). The monsoon rain is most abundant in the east and gradually declines as it moves westwards; while winter rains are higher in the northwest declining as it moves south-eastwards.

Observed climate data from 1960s indicate consistent warming and rise in the maximum temperatures at an annual rate of 0.04 – 0.06° C. Warming is more pronounced in high altitude regions compared to the Terai and Siwalik regions. Annual precipitation data shows general decline in pre-monsoon precipitation in far and mid-western Nepal, with a few pockets of declining rainfall in the western, central and eastern regions. In contrast, there is a general trend of increasing pre-monsoon precipitation in the rest of the country. Monsoon precipitation shows general declining trends in the mid-western and southern parts of western Nepal.

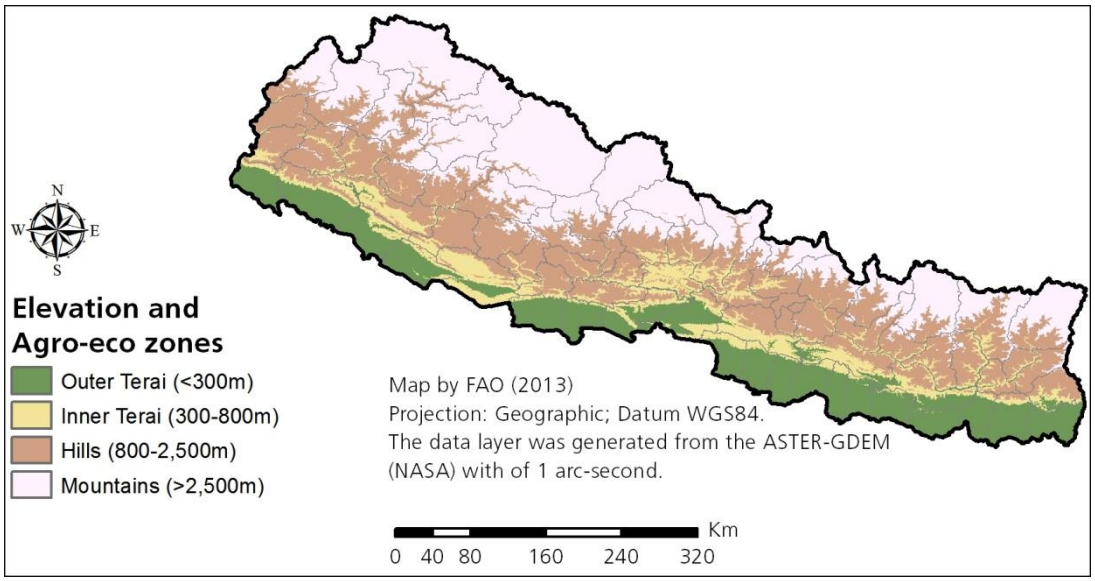


Figure 1. Agro-ecological regions of Nepal

Climate and its variability is already affecting Nepal's agriculture sector. The climate related hazards like floods, drought, hailstorms, heat and cold waves; and pests and diseases, soil erosion, deforestation, desertification are recurring and pose severe threats to the sector. From 2002 to 2009, 68,235 hectares of crops mostly dominated by important cereals like rice, wheat, maize and millet are damaged by climate related extreme events[1].

Reduced food, feed, fuel and fibre lead to distress, poverty, food insecurity, malnutrition and deficiency syndromes among the vulnerable communities mainly in the hills and mountains of Nepal. Rapid population growth, rainfed agriculture (about 65%), shrinking farm size, land degradation and faulty and marginal agricultural practices are leading to exposure of the vulnerable communities and their livelihoods to climate risks and inflicting substantial physical and economic losses.

The LDCF project focuses four districts in two development regions: Eastern Development Region (Udayapur and Siraha) and Western Development Region (Argakhanchi and Kapilbastu). In general, the focus districts represent two eco-regions - mid-hills (Udayapur and Argakhanchi) and terrai (Siraha, Kapilbastu). The mid-hill districts have a varied ecology, with tropical to subtropical climate in southern Churia hills and plains, and mild temperate type of climate in mid-hills. About 15-26 percent of the total land is cultivable in the midhill districts. The forest coverage ranges from 41-72 percent. The total average rainfall is 1 260 mm and the irrigation facilities are very poor. In terrai, the coverage of cultivable land ranges from 56-67% and the forest coverage ranges from 41-48 percent. The total average rainfall is 1,467 mm. The Tarai districts are considered productive, but poor irrigation is also a crucial problem.

The poverty rate, or the percentage of the population below the poverty line, is the most common indicator for measuring monetary poverty for an area or population group[2]. Rural poverty rates in the above mentioned districts are high and increase the vulnerability of agricultural population to climate risks. In hills, average poverty rate is 34.5%, while in terai ecological zone (in 2 selected districts - Siraha and Kapilbastu) it is 27.6%. Poverty and frequent hazards lead to migration of rural population depending on agriculture to urban areas and to foreign countries. Once the productivity of both monsoon and winter crops decrease, many people from villages are compelled to go outside to engage in off-farm labour work for earning livelihood.

In some areas, for example in one of the villages of Kapilbastu district, due to flood, 45-50 families have already migrated to land near the forest area at the bank of Kothi River. This internal population movement due to climate risks is already leading to conflict between existing forest user groups and people moving from outside of the area. Changing climatic conditions might worsen these problems if adequate adaptation measures are not taken up to protect the livelihoods of the most vulnerable population.

Farmers have inadequate knowledge and skills on improved farming like proper use of chemical fertilizer, early variety selection, and application of pesticide (time and amount) based on weather patterns, seed and nursery management and off-season vegetable production, soil fertility management techniques and post-harvest technologies. Poor marketing skills and information is another constraint. Farmers of terrai are affected by subsidy policy of neighbouring countries on seeds, fertilizers, and irrigational facilities. Hence Nepali farmers are unable to compete with neighbouring farmers while selling the agriculture products. Maize, wheat and paddy are the major crops; the productivity trends are highly variable due to climate related constraints. The declining productivity of oil crops is perceived in all the study villages.

[1] Bimonthly Bulletin of Crop and Livestock Situation in various years, ABPSD, Ministry of Agricultural Development (MOAD), Government of Nepal.

[2] ISDR (2009). Global Assessment of Risks, Nepal Country Report, ISDR Global Assessment Report on Poverty and Disaster Risks 2009, 193p.

There are major five types of livelihood groups. They are agriculture, labour (inside), labour (outside), village groceries and services. Agriculture is the mainstay of majority (87-90%). Sharecropping and on-farm and off-farm labour work is the main coping strategy for food scarcity. There is a practice of buying livestock and its products to make certain household income and meet the dietary needs. Vegetable farming, fruit plantations and livestock rearing are emerging as profitable enterprises in recent years as an alternative income source. Commercial vegetable is found in Teari than in the mid-hills. These enterprises are facing challenges of pest and diseases and erratic rainfall.

The access of people to livelihood assets is the key for improved adaptive capacity to climate risks. Access to natural resources is found more in mid-hills compared to Terai. In terms of financial assets, the people of Terai are in better position than that of mid-hill because of proximity to financial institutions. But, access to social assets is better in mid-hills because the mid-hill community networks are comparatively well organized and partly due to their remoteness. Contrary to this, the access to various physical assets is in better position in Terai. In terms of human assets, Terai is comparatively in better position than that of mid-hills.

Small, poor farmers, marginalized and disadvantaged communities and households (mostly socially excluded) are particularly vulnerable to baseline problems. In particular, women, children and aged people are the most vulnerable as they do not possess adequate access to land, property, means and resources to cope with the situation. Poor families can hardly protect themselves against the occasional shocks occurred due to droughts and floods. Owing to various difficulties related to the livelihoods, more than two million prime-age male adults have already migrated abroad for foreign jobs. Though the money remitted by them has provided some cushions for buying food for the family members at home, these migrations have also created shortage of agricultural labour in the villages.

In these 4 districts, small-scale farmers have no adequate access to agricultural loans and financial facilities to improve their irrigation systems, buy seeds, seeding materials, and fertilizers. Small-scale farmers also need capacity to obtain loans, agricultural inputs and support services from the service providers such as District Agricultural Development Office (DADO), District Livestock Services Office (DLSO), local NGOs, Indian markets, cooperatives, private shops and agro-vet, and the Agriculture Development Banks (Nepal).

The DADO and DLSO usually provide, though with limited coverage, technical trainings and inputs to farmer groups, promoting skills and knowledge on agricultural technologies and practices. However, trainings do not directly include climate-related risks. In the last few years, the saving and credit groups and cooperatives have considerably grown, and some farmers prefer taking loans from them due to their lower interest rates, easy access and fast transactions. Barriers that are preventing climate change adaptation from being mainstreamed at local level, and undermining adaptive capacity of local farmers include: i) the inadequate knowledge on climate impacts, ii) the poor market information, iii) the complicated processes to access loans, and iv) the growing trend of taking loans even at high interest rate (24% or even more) only for sustaining livelihoods.

In addition to the baseline problems, **climate change** is expected to bring additional threats of greater magnitude. Studies on future climate change projections for the Himalayan region and Nepal are limited because of the lack of long-term climate records and the uncertainties related to downscaling of General Circulation Models (GCMs), which, however, are currently the best option for assessing climate change. MOEST (2004) showed that the rise in average annual temperature will be in the range of 2 to 4 ºC across Nepal, with a doubling of atmospheric carbon dioxide (CO_2). The temperature rise will be greater in western Nepal than other regions, with the winter season increase reaching 2.4 to 5.4 °C in Nepal's far-western region. Agrawala *et al.* (2003)[3] reported that significant and consistent increases in temperatures are projected for Nepal across various climate models, with

[3] Agrawala, S., Raksakulthai, V., Van Aalst, M., Larsen, P., Smith, J. & Reynolds, J (2003). *Development and climate change in Nepal: focus on water resources and hydropower*. Paris, OECD.

somewhat larger increases for the winter months than the summer months. For all seasons, the rising gradient is from east to west. Overall, the temperature in the country is found to be rising at the rate of 0.41 ºC/decade.

There is evidence of increasing occurrence of intense rainfall events, an increase in flood days and generally more variable river flows. These changes are consistent with a range of climate change models and are predicted to continue into the future. The summer monsoon is likely to become more intense, with increasing occurrence of heavy rainfall events, while winter precipitation is predicted to decline. Widespread glacial retreat is expected to continue, resulting in significant changes to hydrological regimes (flows) and increased risk of GLOFs. As glacier melt accelerates, increased runoff can be expected initially and followed by a steady decline.

In the model output analysis, the Geophysical Fluid Dynamic Laboratory (GFD3) model projects a general increase in precipitation for the whole of Nepal, with the gradient from southwest to northeast in the magnitude of 150 to 1 050 mm at doubled CO_2 level. The Canadian Climate Centre model (CCCM) projects a decrease in precipitation from 0 to 400 mm in the eastern region, but increases of up to 1 600 mm in other regions. The GCM projected precipitation scenario against observed precipitation values shows that the rainy season in Nepal will be more intense, with a particularly noticeable increase in June and July, and that winter and spring will be drier than they are now. Climate models also project an overall increase in annual precipitation, but with high standard deviation. The increase in precipitation during the summer monsoon months (June, July and August) will be more pronounced, with a slight increase in winter precipitation also reported.

FAO has conducted further analysis with data from the ECHAM5 model (Max Planck Institute for Meteorology [MPI]), which was also used for the IPCC fourth Assessment Report. In conclusion, scenario A1b is characterized by a strong change in temperature, which is fairly uniform in the *terai* belt, but heterogeneous in other zones. Both monsoon and annual rainfall are expected to decrease, mainly in the hill zone of the eastern region. Scenario B1 is characterized by changes in rainfall and its temporal distribution. The temperature will increase, but less than in scenario A1b.

According to scenario A1b, rainfall decreases are expected especially in the hills zones of eastern and western regions. Together with the temperature rise, this will exacerbate the drought phenomena, with a significant impact on agriculture. The agriculture sector may be affected by water stress, while the reduced rainfall will probably decrease the number of flood events. However, to confirm this more detailed model, consideration of daily rainfall is required. Scenario B1 predicts comparatively lower June/July mean daily temperature changes across Nepal. The model forecasts a rainfall decrease, mainly in the eastern region of the country. Given these changes, drought frequency may not increase significantly in the *terai* region, except in eastern parts. However, there are uncertainties in the model projections for evaluating hydrological processes.

Kulkerni *et al*. (2013) [4] applied the Hadley Centre's high-resolution regional climate model PRECIS (Providing Regional Climate for Impact Studies) to subregions in the Hindu Kush-Himalayan region – western, central and eastern Himalaya. The central and eastern Himalaya regions partly cover Nepal on the west and east, respectively. The key projections from these efforts were that monsoon rainfall may decrease over the central Himalaya region (western Nepal) in the near future (2011–2040), whereas there may be a 5–10 percent increase in rainfall in the eastern Himalaya (eastern Nepal). The ensemble projected changes in seasonal rainfall (2011–2040) showed decreases over central and eastern Himalaya. Average temperatures are projected to rise by 1–2 °C in 2011–2040; increases in mean annual temperature may be greater in central than eastern Himalaya.

[4] Kulkarni, A., Patwardhan, S., Kumar., K.K., Ashok, K. & Krishnan, R. 2013. Projected climate change in the Hindu Kush-Himalayan region by using the High-resolution Regional Model PRECIS. *Mountain Research and Development*, 33(2): 142–151.

The following is a summary of anticipated changes in temperature, precipitation and runoff based on a review of current literature:

- Overall, temperatures will increase throughout Nepal, especially at high altitudes and during the winter season
- The numbers of days and nights considered hot by current climate standards will increase
- There will be a wide range of mean annual precipitation changes across the ecoregions of Nepal, with the tendency varying according to different scenarios and models
- Downstream river flows would be higher in the short term, but lower in the long term because of a shift from snow to rain in the winter months
- Extreme weather events will increase, especially floods during the monsoon season and the duration of droughts during the winter months.

FAO's Situation Assessment and Baseline Study[5] identified the major climatic hazards. In general, 2 mid hills districts selected for the project (Udayapur and Argakhanchi) are frequently affected by floods, landslides, hailstorms, frost, droughts and epidemics of crops and livestock diseases and pests. Similarly, in selected 2 Terai districts (Siraha and Kapilbastu), the major hazards as perceived by the farmers are flood, drought, heat wave, cold wave, and frost, dew / pala (pala = winter fog causing blight in potato).

The areas along the riverbank are suffering from sedimentation caused by flood. More irrigation is required in such land due to high percolation and seepage problem. Flood and landslides are mainly responsible for damage of standing crops, erosion of productive land along the riverbank or at the foothill areas. These hazards also cause damage to community's assets like road, schools, market centres, irrigation canals, drinking water systems, and forest resources. Frequent droughts are responsible for crop failure mainly the winter crops like wheat, oilseed, and pulses. Cold wave not only damages the productivity of winter crops but also makes life very tough particularly to elderly and children.

The frequency of the occurrence of the climate risks is increasing both in mid-hill and terai districts. In farmers' view, the main reasons are changing climatic conditions, especially rainfall, temperature and extreme climate events such as floods and droughts. High temperature and breaks in rainfall season lead to longer droughts. The severity of these hazards are expected to further increase in future affecting particularly to productive land and community's assets like road, irrigation canal, school, markets, etc. The occurrence of different hazards not only challenged the people's lives and livelihood but also destroyed the land and community assets at local level.

The climate risks also affect the social environment. In the recent years, there are more cases of seasonal and permanent migration thus the workloads of elderly, women and children particularly have increased. Due to constant fear and losses of crops and agricultural livelihood assets due to various risks, tendency of shifting occupation from on- farm to off- farm is common in rural areas. With the tendency of continuous crop failure, people usually sell their land even in cheaper price and divert to small-scale business. With the increasing trends of climatic risks, evidences were also observed on conflict of indigenous and migrant population about the resource sharing. The outbreak of many respiratory and vector borne diseases such as Malaria, Dengue, Japanese Encephalitis, Kala-azar and communicable diseases like cough, cold, eye infection, etc. were also perceived by the people.

Rainwater, surface irrigation, shallow tube well, conservation pond are some of the sources for irrigation. However, the reliability of irrigation facilities is also in decreasing trend. The reasons are frequent flood, longer droughts, depletion of forest resource in Churia area and irregular rainfall patterns. The longer droughts are responsible for lowering the ground water table, which caused poor performance of deep and shallow tube-wells in Terai. With the increasing sedimentation through high

[5] FAO (2014) Managing climate risks and adapting to climate change in the agriculture sector in Nepal, FAO Environment and Natural Resources Service Series, No. 22 – FAO, Rome, 2014

soil erosion in upstream, there is a seepage problem of water hence farmers are unable to divert the water from the river into the canal. Erratic rainfall has negative impacts on agriculture sector in both mid-hill and terrain districts. Majority of the people opined that there are changes in rainfall pattern.

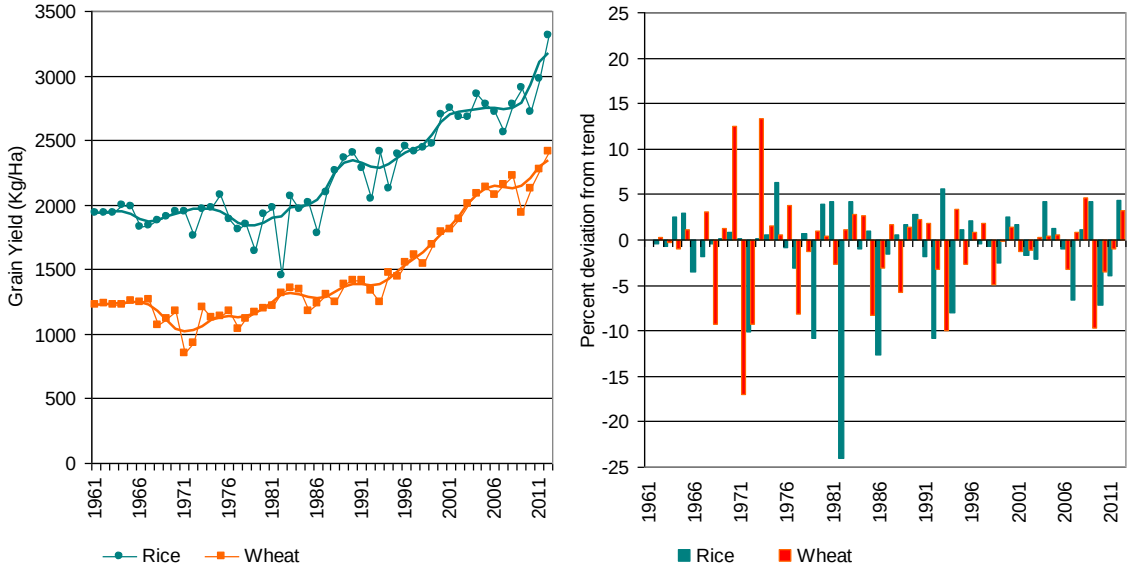


Figure 2: Grain yield trends of rice and wheat and percentage deviation of yields from trends (1961–2012)

Change in rainfall month as well as the negative impacts of decrease in rainfall are similar in both mid-hill and Terai districts. The change pattern of hailstone is more observed in mid-hills. A household survey as part of FAO's baseline study indicates that about 59.2% respondents of mid-hills (Udayapur and Agrakhanchi) and 62.3% of Terai (Siraha and Kapilbastu) have reported significant changes in rainfall pattern. Similarly, majority of the respondents (62.2% in mid-hills and 59.8% in Terai) opined that they have clearly experienced the changed pattern of temperature. People have experienced the impacts of climate change but they have inadequate knowledge about underlying causes and how to manage them.

The projections of climate change indicate that the key impacts are likely to include: significant warming, leading to increased frequency of extreme events, including floods and droughts; and overall increase in precipitation during the wet season but reduced number of rainy days. An additional threat derives from climate change in the Himalayan environment, which is likely to further increase the number of hazardous events and their social, economic and environmental impacts. It is likely that new areas and a variety of different climatic-induced threats will further increase the impacts of hazards.

Rapid population growth, shrinking farm size in Terai region, continued unplanned agriculture in climate risk prone areas is likely to further increase the exposure and loss of livelihoods, if no countermeasures are put in place. This BAU scenario poses a big challenge to the agriculture sector, which is expected to suffer livelihood losses and the reduction of crop and livestock production. Since agriculture is Nepal's principal economic activity (employing over 65% of the population and contributing to 33% of the GDP), country's vulnerability to climate change is extremely high.

Climate change is likely to affect the agriculture-dependent livelihoods and ultimately, food security. The per-capita food availability is eroding over the years because of increased population against almost stagnant performance of the agriculture sector. The per-capita holding size of agricultural land is less than 0.8 ha., which contributes farmers to meet about six months' food production from their farms in a low production environment. Around 42 districts (out of 75) in the country encounter food deficit every year.

The impacts of climate change on agricultural production as calculated in Cline's models suggests a decrease of 17.3% production above a temperature increase of 2.5° C. These figures do not reflect the most likely negative impacts of extreme climate events on agriculture production. Recent impacts of extreme climate events suggest that production decline is obvious even with slight changes in temperature and rainfall regimes.

Nepal's vulnerable farming economy is facing risk due to changes in the reliability of stream flow, a more intense and potentially erratic monsoon rainfall, and the impacts of flooding. Decline in rainfall from November to April adversely affects the winter and spring crops. Rice yields are particularly sensitive to climatic conditions and these may fall in the western region where a larger population of the poor live and this could threaten overall food security. According to assessments for NAPA[6], climate change is posing a threat to food security due to loss of some local land races and crops.

Improvements are demanded in the delivery of livelihood diversification strategies, localized resource conservation practices, protection of livelihood assets and provision of quality agriculture support services and integration of climate change considerations into policy. Similarly, importance has to be given for improving technical and institutional capacity of institutions with a view to address the impacts of climate change in addition to baseline development programmes. In response to the **baseline problems** described above, the Government of Nepal with support of development partners including FAO have responded with several initiatives which constitute baseline (co-financing projects) for the proposed LDCF project.

C. Institutional and policy framework

For the past two decades, **Nepal Agriculture Perspective Plan (APP)**, unveiled in 1995 with a 20-year vision, remained the main document referred to for Nepal's agricultural strategy, policy and programmes. The strategic focus of the APP was based on a vision of strengthening Nepal's regional economic linkages between the hills and the Tarai based on their respective comparative advantages – cereals in the Tarai and high-value fruits, vegetables, cash crops and livestock in the hills. It adopted a Green Revolution-type approach based on massive investments on key inputs such as irrigation, fertilizers and rural roads to be focused on high potential areas, generating backward and forward linkages and multipliers across the economy. The APP is judged to be sound in design but suffered greatly in implementation. In the meantime, since about 2000, the GoN has formulated several broader policy frameworks related to the sector and sub-sectoral policies to guide development agriculture in Nepal.

Table 1. Major policy frameworks and sub-sector policies and key objectives

Policy/sub-sector policies	**Salient features**
Agriculture Perspective Plan (APP) (1995)	Twenty-year APP developed with assistance from ADB is the first consolidated, elaborated and long term policy document in agriculture sector. It has overall objective of commercialization of subsistence agriculture and acceleration of agricultural growth. The transformation of agriculture from subsistence into commercial is expected from diversification and realization of comparative advantages that result into expansion of opportunities for agribusinesses. APP recognized effects of agro-chemicals on environment and human health and emphasized Integrated Pest Management (IPM). It also recommended tree plantations, particularly fruit trees for sustainability of the farming system.
Policy and Institutional	Established APP Monitoring Unit in Ministry of Agricultural Development (MOAD)

[6] Ministry of Environment (2010). National Adaptation Programme of Action (NAPA), Government of Nepal, Kathmandu, Nepal.

Arrangement for the Effective Implementation of the APP (2001)	
National Agriculture Policy (2004)	Within a decade of the APP implementation, the government felt a need for a separate policy document with broader approaches and coverage leading to formulation of National Agriculture Policy (NAP) in 2004. The main objective of the NAP is to contribute to food security and poverty alleviation through higher economic growth that can be realized by promotion of commercial and competitive agriculture. The specific objectives of the policy document include raising productivity and production; developing commercial and competitive agricultural system; and conservation and utilization of natural resources and environment. The policy recognizes the role of international treaties, agreements and requirements for setting national standards. The NAP opened avenues for formulation of subject specific and product specific policies for further elaboration of the provisions included in this framework policy document. The NAP also proposes for IPM and IPNM. It is supportive to biosecurity through reducing the use of chemicals such as pesticides, hormones, antibiotics and chemical fertilizers.
Agri-business Promotion Policy (2006)	It is formulated within the broad framework of the NAP. It's main objectives are to assist market-oriented and competitive agricultural production; contribute to capturing domestic markets and export promotion by developing agro-industries; and assist poverty alleviation through agribusinesses. The policy emphasizes on product diversification, service delivery and private sector involvement to transform the subsistence agriculture to commercial one. The policy measures suggested include public private partnership (PPP) in agricultural services delivery, and development of infrastructure for post-harvest, marketing and processing. The infrastructure envisaged includes business service centers, markets and collection points, and rural roads and electricity. It also emphasizes on group loans, insurance schemes and some incentives by reducing import tariff on equipment and machineries, rebate on electricity tariff, long term leasing of farmlands and waiving land ceiling for agribusinesses. The policy stresses on the quality control of agriculture inputs, services and outputs for commercialization of agriculture.
Trade Policy 2009	Emphasizes on export promotion, trade diversification and reduction of trade deficit.
National Fertilizer Policy (2002)	The policy aimed to support in enhancing agricultural productivity by ensuring supply of good quality fertilizer through production, import and distribution by the private sector. Specifically, the policy document emphasizes on the provision of conditions for enhancing fertilizer consumption and promotion of integrated plant nutrients management (IPNM) system for efficient and balanced use of the organic and chemical fertilizers. The policy adopts strategies such as ensuring fertilizer availability; making fertilizer distribution system transparent, competitive and effective; maintaining the quality of the fertilizer; and managing IPNM system.
National Seed Policy (2000)	Emphasizes on replacement of low yielding traditional seeds with modern variety seeds. In addition, it stresses on conservation of agro-biodiversity and establishment of breeders rights over new variety of seeds. It proposes for conducting 'research' (which can be construed as the risk assessment) on GMO seeds. Such seeds can be released for use only if they do not compromise biosafety in the country. The policy also proposed private sector participation in seed testing, seed analysis, seed sampling, crop inspection etc. for maintaining seed quality in the country. Thus the seed policy is

	concerned with seed quality control, agro-biodiversity conservation and biosafety which are the parts of the Biosecurity.
National Coffee Policy (2003)	Aims for import substitution and export promotion of coffee. Its objective is to develop sustainable coffee industry for income generation, employment promotion, foreign exchange earnings and environmental protection. The policy implicitly assumes that planting coffee will improve and protect the environment. The policy proposes for development of organic coffee with a national logo. The coffee policy envisages for a coffee laboratory for quality analysis and control. This policy document has no provisions of grading and cleaning of coffee and also ignores the environmental effects from coffee processing. Organic coffee plantations and quality control can be supportive to the biosecurity.
Dairy Development Policy (2008)	Recognizes the importance of livestock sub-sector with a long-term vision of encouraging participation of public, private and cooperative sectors in milk production. It has objectives of increasing milk production, expanding milk business, import substitution and export promotion, and milk quality control. For increasing the milk production it emphasizes on extensive and effective animal disease control. For expanding milk business, the proposal is for loan and technical supports for quality milk and milk products. First, the policy proposes for a regular monitoring of milk and milk products in the market and consumer awareness on storage, expiry period and methods of consumption. Second, it proposes for revision of standards of milk and milk products. Third, it recommends for development and enforcement of suitable packaging standards of milk and milk products. Fourth, implementation of a code of conduct (COC) for processing plants is proposed for collection and processing of milk. Finally, it also emphasizes for provision and strengthening of laboratories for quality assurance of milk and milk products.
Agro-biodiversity Policy (2007)	Provides overall policy framework for agricultural biodiversity conservation in the country. Some of the objectives of the policy relating to Biosecurity are conserving, promoting and sustainably using agro-biodiversity and contribute in maintaining sustainable ecological balances over time.
Nepal Biodiversity Strategy (2002)	Aims in protection and wise use of the biodiversity for, inter alia, protection of ecological processes and systems. It is a comprehensive document for the protection of biodiversity in the country. In terms of Biosecurity, the strategy has some weaknesses. Threats to wetland biodiversity are identified as area encroachment, unsustainable harvesting of wetland resources, industrial pollution, agricultural runoff, siltation, and the introduction of exotic and invasive species. But the problem of exotic and invasive species on terrestrial ecosystem is not recognized.
National Bio-safety Framework (2007)	Presents policy, draft legislation, administrative procedures and technical instruments necessary to ensure an adequate level of protection during transfer, handling and use of living modified organisms (LMOs) produced through modern biotechnology. The LMOs are recognized as a threat to human health and conservation and sustainable use of biodiversity (MOFSC, 2006). The framework proposed a biosafety policy with main objectives of protecting biodiversity, human health and environment from possible adverse effects of the trans-boundary movement of the products of modern biotechnology. The policy stresses in developing legal, technical, administrative aspects of biosafety and some mechanisms for public participation for biosafety. It also emphasizes on the development of institutional, human resources and technical capabilities for biosafety related functions. It asks for adoption and accommodation of regional and international standards on risk assessment and management. The frameworks proposes for framing a national biosafety Act in order to regulate the use, development, import, movement, storage, and release of GMOs, but it is yet

	enacted.
Forestry Sector Policy (2000)	The short term objectives of the policy is to provide increased opportunities to the people for forestry resource management under the community, private and leasehold forestry programs. It also emphasizes on management of natural forests of the *Terai* and Inner *Terai* more effectively. The policy has provisions of land use planning, conservation of ecosystems, biodiversity and genetic resources, production and utilization of forests and social aspects of land and forestry resources.
Herbs and Non-Timber Forest, Products Policy (2004)	Addresses the holistic development of NTFP sector with long-term goal to substantially contribute to Nepalese economy by conserving and preserving high value herbs and NTFPs and establish Nepal as an enormous source of Herbs and NTFPs internationally. The objectives include regeneration, reproduction, ex situ conservation of NTFPS; local processing through private sector participation; business development services; inclusion of the disadvantaged groups and earning of foreign currency through the competitive development of NTFPs.
National Wetland Policy (2003)	Its major objective is to involve local people in the management wetlands and conserve wetlands biodiversity with wise use of wetlands resources. The objectives are also to identify wetlands and prepare management plans to prevent degradation; identify local people's knowledge, skill and practice regarding wetlands and promote their innovations and traditional research for the sustainable use of wetlands resources; and conserve and manage wetlands scientifically. The policy includes wetlands management based on local participation; and classification of wetlands and management based on Ramsar Treaty. It also emphasises on wise use of wetlands and promotion of awareness among the people living nearby the wetlands.
Agriculture Development Strategy (under the process of approval)	Considering the changed national and international contexts Government of Nepal requested ADB to develop ADS to carry over the initiatives of the APP. The main objective of the ADS is to succeed the APP and give long term strategies for agricultural development in the country. The scope[7] of the ADS is very wide including food security, agricultural productivity, connectivity and resilience; sustainable production and resource management through climate change mitigation; adaptation and improved land and water management and water allocation; increased private sector development (including cooperative sector), delivering fair reward to all stakeholders in the value chain; and policies, institutions, and investments.

The **National Agriculture Policy (NAP 2004)** remains to date the main policy document for the sector as a whole. Its formulation was prompted by a number of new developments such as increasingly liberal policy environment, increased role for the private sector, MDG commitments, and Nepal's WTO membership and regional trading agreements. It set food security and poverty alleviation as the underlying goals to be attained through higher agricultural growth based on increased productivity and commercial and competitive agricultural system. It upheld the long-term vision and strategy of the APP and gave continuity to its approach of pocket programmes. The NAP (2004) identified three core goals: i) increasing agricultural production and productivity; ii) making agriculture commercialized and competitive in regional and world markets; and iii) conserving, promoting and utilizing natural resources, environment and bio-diversity. The Agri-business Promotion Policy (2006) further elaborates on some of the policies in NAP (2004) focused on the promotion of agri-business through product value chains.

In Nepal's context, policy frameworks for biodiversity and natural resources are very important. There are several of these policies in these areas, as listed above. In order to promote conservation, these frameworks recommend judicious use of chemical fertilizers, pesticides and plant and animal growth

[7] http://www.moad.gov.np/ads/index.php?pageid=147 accessed on July 9, 2013.

stimulating hormones, promotion of compost fertilizer, establishment of a gene bank and *in-situ* conservation sites, agro-forestry in degraded lands, and community-based conservation farming to protect watershed and river banks. These goals and polices have been adopted in subsequent policy frameworks also. Thus, the long-term vision articulated in the agriculture chapter of the **Three-Year Interim Plan 2007-2010** reads as follows, "to modernize and commercialize the agriculture sector, by acknowledging the APP and the National Agriculture Policy (2004) as the central policy for the development of agriculture". In support of that, five specific objectives are listed as follows:

- To increase agricultural production and productivity.
- To maintain food sovereignty by ensuring food security.
- To make the agriculture and livestock sub-sectors competitive by transforming subsistence agriculture into commercial agriculture.
- To increase employment opportunities for rural youths, women, *Madhesis*, persons with disability, Muslims and deprived groups.
- To conserve, promote and utilize agricultural biodiversity through the development and dissemination of environment friendly technologies.

The **Three-Year Plan (2010/11-12/13)** essentially continues with these goals and priorities, with emphasis on some additional priorities such as nutrition security, climate change, cooperatives and human resources development. Lastly, in this process, two new important policy documents were formulated in 2010 – **the National Agriculture Sector Development Priority (2010) (NASDP)** and the **Nepal Agriculture and Food Security Country Investment Plan (2010)**. These documents contributed to further updating, fine-tuning and setting priorities in accordance with the above mentioned vision and policies. This CPF has evolved out of these latest processes. These policy frameworks related to the formulation of this CPF are presented later in Section 3.5.

Climate Change Policy (2011): The Government of Nepal through the Climate Change Policy (CCP 2011) expressed urgency to address the climate change by implementing relevant programmes to minimize the existing and likely impacts in different ecological regions. One of the goals of the CCP is to promote climate adaptation and adoption of effective measures to address adverse impacts of climate change through technology development and transfer, public awareness raising, capacity building and access to financial resources. The goals of the policy also includes development of a reliable impact forecasting system to reduce the adverse impacts of climate change in vulnerable areas in natural resources and people's livelihood.

Out of the seven objectives of the CCP three are related to climate change adaptation and livelihood. First is to implement climate adaptation-related programmes and maximize the benefits by enhancing positive impacts and mitigating the adverse impacts. Second is to enhance the climate adaptation and resilience capacity of local communities for optimum utilization of natural resources and their efficient management. Finally, it is to improve the living standard of people by maximum utilization of the opportunities created from the climate change-related conventions, protocols and agreements.

The policy statements emphasize on climate change adaptation and livelihood. It calls attention to link and implement climate adaptation with socio-economic development and income-generating activities. The policy also underscores forecasting water-induced disasters and risks created from climate change and providing early warning information, developing necessary mechanism for the implementation of preventive measures and ensuring regular supervision, and enhancing capacity. Similarly, it includes identifying the people, communities and geographic areas impacted by climate change and implementing adaptation and impact mitigation measures based on local knowledge, skills and technologies. The policy emphasizes on identifying, developing and utilizing crop varieties and species that can tolerate drought and floods. It also includes soil and water conservation through measures such as source protection and rain water harvesting.

Climate Resilience Planning (2011): Climate Resilience Planning is a tool for long-term climate adaptation. Enhancing the resilience of development plans to climate risk is a strategic and proactive move that requires assessment of anticipated climate threats and building measures to reduce the threats. This document describes community resilience and adaptation under sectoral vulnerability under the development scenario including agriculture. This also presents climate framework strategy and screening approach for development actions.

National Framework on Local Adaptation Plans for Action 2011 (LAPA Framework): LAPA Framework (2011) is developed to support operationalization of NAPA (2010), National Climate Change Policy (2011) and Climate Resilience Planning (2011) through integration of climate change resilience into local-to-national development planning processes. The Framework supports the Local Self Governance Act (1999) to integrate local adaptation priorities into village, municipality, district and sectoral level planning processes. The Framework adopts four principles, namely, bottom-up, inclusive, responsive and flexible to ensure the integration of climate change resilience into local-to-national planning. The bottom-up planning starts from the households and moves upwards to the Ward and VDC level and higher. The inclusiveness requires dialogue between diverse stakeholder groups in decision making including men and women of different ages, castes or ethnicities. To be responsive, the planning processes should focus on building resilience of the most climate vulnerable communities first. The principle of flexibility refers to the ability of the planning processes to be iterative in their approach. The units for integrating climate change resilient planning are VDC and Municipality that capture location specific adaptation priorities within their territories.

The framework presents seven steps for LAPA development. The steps include details on climate change sensitisation, vulnerability & adaptation, prioritising adaptation options, developing an adaptation plan, integrating LAPA into local-to-national planning, implementing local adaptation plans and assessing progress through monitoring and evaluation. The framework describes 18 LAPA tools for use in the process.

The government with the aim of integrating climate change resilience into development planning processes at different levels developed a **Manual for Local Adaptation Plans for Action (LAPA)** in 2011. The manual can help planners, practitioners, trainers, community groups, citizen forums, women and indigenous communities in integrating climate change resilience into local-to-national planning processes and outcomes. The manual includes process, steps and tools for integration. The LAPA manual follows the planning process followed by MOFALD which is the lead institution for implementation of LAPA. It adopts bottom up planning process starting from Ward Citizens' Forum to VDC/Municipality and district level. The Manual recommends seven steps in preparing and implementing LAPA. The steps include climate change sensitization, climate vulnerability and adaptation assessment, prioritization of adaptation options, developing LAPA, integrating it into planning processes, implementing it and assessing its progress.

The Manual has identified some 19 tools for help adaptation which include climatic hazard trend analysis, disaggregated vulnerability matrix, hazard and impact risk assessment, climate adapted well-being assessment and gender and social inclusion integration among others. Some of the tools are highly useful for the LAPA development process in the proposed project.

United Nations Development Frameworks for Nepal 2013-2017: Government of Nepal and United Nations Country Team in Nepal developed United Nations Development Frameworks (UNDAF) for Nepal 2013-2017 in 2012. The Framework has proposed 10 outcomes divided into three components, namely, advancing equality through equity, protecting development gains and creating an enabling environment for enhanced international cooperation. The 7th outcome falling under the second component states that "*People living in areas vulnerable to climate change and disasters benefit from improved risk management and are more resilient to hazard-related shocks*". The proposed project will help to achieve this outcome. The project is also somehow assist to the first component second outcome "*vulnerable groups have improved access to economic opportunities and adequate social protection*".

Agriculture Development Strategy (ADS) 2013: A draft Agriculture Development Strategy (2013) is available for review. Considering the changed national and international contexts Government of Nepal developed ADS. The main objective of the ADS is to succeed the Agriculture Perspective Plan (APP) and give long term strategies for agricultural development in the country. The scope of the ADS is very wide including food security, agricultural productivity, connectivity and resilience; sustainable production and resource management through climate change mitigation; adaptation and improved land and water management and water allocation; increased private sector development (including cooperative sector), delivering fair reward to all stakeholders in the value chain; and policies, institutions, and investments. The policy options of the ADS support the LAPA as an implementation tool for the NAPA for climate change adaptation.

The ADS provisions some measures for improving resilience of farmers. The measures include promotion of research on identification and adoption of stress tolerant crop, livestock and fish species for the development of climate resilient agriculture. Similarly, another measure proposed is to establish early warning system and adopt early warning information in managing climate change risk in agriculture. It also proposes designing ICT based climate information systems for farmers and crop yield forecasting system. Yet another recommendation is to establish Farmers Welfare Fund that would provide assistance to farmers under distress to overcome temporary losses of income. In addition, it also proposes for strengthening of food reserve system to cope with emergency. The ADS emphasizes on increasing land and labour productivity through agricultural research and extension, efficient use of agricultural inputs, efficient and sustainable use of natural resources, and increased resilience to climate change and disasters. The proposed project will assist to meet the objectives of the ADS.

An Approach Paper to the Thirteenth Plan (2013/14 – 2015/16): The approach paper is the basis for the 13th plan. It identifies climate change as one of the main challenges to attaining the expected outcomes in the agricultural sector. One of the seven strategies of the thirteenth plan approach paper is to implement development programs which support climate change adaption. One of the major objectives of the paper under Agriculture, Irrigation, Land Reform, and Forest sector is to develop and disseminate environment-friendly agro-technologies to minimize the adverse impacts of climate change. The operative policy for this purpose is to promote adaptive techniques and practices to minimise the adverse impacts of climate change. The operating policies for food and nutrition include development of crops resilient to climate change and scaling up of these crops in food-insecure areas. Some other strategy includes making meteorological services reliable, trustworthy, regular and good-quality in order to mobilise them in efforts to mitigate the impacts of climate change. The review of the recent and pertinent policies, strategies and related documents shows that the proposed project is within the area of eh policy commitments of the government of Nepal as expressed in the policy documents.

1.1.1 Rationale

a) Baseline projects and investments

A completely new set of baseline projects have not affected the LDCF activities. The government of Nepal programs the LDCF financing for implementation of the adaptation priorities identified through the Priority Framework for Action (PFA) of the Ministry of Agricultural Development (MOAD). Therefore, while the baseline projects identified during the PIF stage have been completed, the outcomes, outputs and activities for the proposed LDCF project remained unchanged given that they are focused on implementing the PFA and have not been addressed through other similar projects. It was evident from the assessment during the PPG stage that there was no new climate change related initiatives started between PIF completion and full project preparation. In other words, while the completely new set of baseline and co-financing projects identified address issues of local development, they do not consider climate change related priorities explicitly. In this sense, the

proposed project will build on these activities to deliver the climate change adaptation benefits established in the PFA

Agriculture and Food Security Project (UTF/NEP/073/NEP: 2014 - 2018); Co-financing of USD 8.62 million from the Food Security Project. The main aim of this project is to contribute to nutrition and livelihood through Farmers Field Schools (FFS). This $46.5 million GAFSP[8] funded project is to improve household food security through increased agricultural productivity, household incomes, and awareness about health and nutrition. The main objectives of the project are to (i) enhance the food security of vulnerable groups enlarging the livelihoods base for farm families; (ii) reduce food and health risks among vulnerable groups and improve income earning and employment opportunities for the poor households in targeted communities; and (iii) contribute to enhancing nutrition security in project areas through promotion of diversified diets, increased nutrient intakes and improved feeding and caring practices for pregnant and nursing women, and children up to 2 years of age. The project is specifically focused in the Mid-Western and Far-Western development regions. The project covers 19 districts (Darchula, Baitadi, Dadeldhuda, Humla, Jumla, Mugu, Dolpa, Kalikot, Bajhang, Bajura Jajarkot, Achham, Doti, Dailekh, Surkhet, Rukum, Salyan, Rolpa and Pyuthan).

The project aims to improve food security among the 150,000 small marginal farmers, 50,000 young mothers, children and adolescent girls, and 25,000 agricultural wage workers in the poorest and most food insecure regions in Nepal covering three major aspects of food security, namely – availability, access, and utilization. The project has four components, namely 1: technology development and adaptation; 2: technology dissemination and adoption; 3: food and nutritional status enhancement; and 4: project management. The first component is to help farmers to use appropriate technologies and resources such as seeds and breeds that contribute to increased productivity of crops and livestock. The second component is to enable farmers in the project area to adopt improved agricultural production technologies and management practices using the resources and technologies provided under the first component. Similarly, the third component is to enhance food and nutrition security through increased food availability for targeted households and promotion of diversified diets and improved feeding and caring practices.

The project activities at the national and regional level will directly complement the LDCF activities. The LDCF activities especially the component 2 assessments that cover the entire country will be used to prioritize location specific technology development and adoption. The LDCF would aim to build climate resilience and additionality into the baseline project while the baseline project would complement the LDCF by providing already tested good practices examples having livelihood diversification and income generation potentials. The LDCF project will also involve the staff who works for the baseline co-financing projects in the technical capacity development activities as part of the component 1.

Ginger Competitiveness Project (MTF/NEP/068/OPS): Enhancing Sanitary and Phytosanitary Capacity of Nepalese Ginger Exports through Public Private Partnerships (PGM/MUL/Nepal Ginger; MTF /NEP/068/STF (STDF 329) – STDF contribution; and MTF/NEP/068/OPS - EIF contribution). It is a US$ 1.17 million project initially planned for March 2012 to February 2014, now it is extended to end of 2015. The objective of the project is to increase income level of ginger farmers through improvements in SPS arrangements and value addition for export to India and other countries. The project is to raise income of ginger-farmers in Eastern Nepal by improving the quality of ginger, increasing capacity to comply with SPS requirements and thereby enhancing market access. The follows value chain approach covering ginger farmers, collectors, traders, cooperatives and ginger producer/trader associations. This co-financing can help in improving livelihood options among the target farmers of this proposed GEF project districts.

Though the project is expected to overlap with LDCF project only for less than a year, the lessons learned especially on livelihood options and its potential for value addition can provide a huge

[8] http://www.gafspfund.org/content/nepal

opportunity for the farm women to diversify their household activities for increased income generation. The good practices examples generated from the Ginger Competitiveness Project will be integrated into the component 3 activities focusing on "Improving awareness, knowledge and communication on climate impacts and adaptation" and replicated through field demonstrations envisioned under component 4. By replicating the good practices identified from the Ginger Competitiveness Project through LDCF would benefit the project beneficieries even after completion of the cofinancing project by December 2015. The replication through LDCF will specifically look at the additionality aspects.

Annual budget of the Government of Nepal for agriculture (crop) and livestock to the project districts is not less than US$ 0.20 million per annum per district which comes to be US$ 3.2 million during the project period. The amount goes to capacity building of the farmers and transfer of technology. In addition, the government will provide in kind support to the project that can be equivalent to USD 0.75 million. The in kind support will be in terms of office space and government staff counterparts.

b) Remaining barriers to address threats of climate change vulnerabilities

The baseline projects will make a significant contribution to addressing issues described above. However, these do not adequately address the following barriers to climate change adaptation in agriculture and livestock sub-sectors and management for food security and environmental sustainability: (i) Insufficient institutional and technical capacity for adaptation to climate change in agriculture sector, (ii) inadequate data and information on vulnerabilities, risks and lack of communication of timely risk information to users at all levels (including farmers); (iii) inadeqaute awareness rising and knowledge management at all levels and (iv) lack of enterprise diversification and inadequate linakges with supply chains and loss of livelihood activities due to climate related extremes.

Barrier #1: Insufficient institutional and technical capacity for adaptation to climate change in agriculture sector: The National Adaptation Plan of Action (NAPA) highlights the gaps in enabling environment for an effective climate change adaptation and sustainable agriculture. This capacity building need would require instituting appropriate institutional frameworks; providing research, training, education and scientific and technical supports in specialized fields relevant to climate change adaptation and also creating public awareness in climate change related issues. The agriculture and food security thematic assessment further highlights gaps in skills for vulnerability and adaptation assessment. The capacity building needs include the ability to conduct in-depth assessment of the impacts of climate variability and future climate change and identifying and developing measures to adapt to future climate variability and change.

Low level of scientific and technical capacity for effective climate change adaptation constraint has individual, institutional and systemic capacity needs dimensions which include training of Nepal's agricultural experts in specific aspects of assessment of impacts of climate change in agriculture and formulation of adaptation strategies and establishment of technology assessment and procurement facilities; and networking climate change actions at country level. The decision-making processes for sustainable climate change adaptation in agriculture require appropriate information that assist the policy- and decision-makers to arrive at well-articulated and relevant policies and plans that systematically integrates climate change concerns. Similarly, inadequate, weak and ineffective research – development linkages in the agriculture sector reduces transfer of technology from research to farmers. This capacity issue is common to both the agriculture and livestock sub-sectors.

Barrier #2: Inadequate data and information on vulnerabilities, risks and lack of communication of timely risk information to users at all levels (including farmers): This barrier limits adaptation at the local level. Inconsistent use of different information sources and lack of clear mandate for interpretation of climate information may lead to wrong decisions in the agriculture sector. There needs to be an official process for generating warnings that include communication

between climate information providers and agriculture departments and communities where impacts are experienced. There is insufficient capacity within the Ministry of Agricultural Development (MOAD) to translate generic information into agriculture specific impact outlooks and alternate management plans. Without translation into information that can be easily understood by users, the information is unlikely to be used. It is also important to combine this information with known vulnerabilities and risks. There is a gap in terms of vulnerability assessment in agriculture and livestock sector at the local level.

Barrier #3: Inadequate awareness raising and knowledge management at all levels: At local level, there is a need to introduce and demonstrate through a guided learning by doing process, a set of locally adapted, innovative and gender-sensitive technologies for adaptation within the agriculture sector; this will further enhance: i) local awareness about disaster prevention and adaptation to climate variability and change; ii) the resilience of local communities against the impacts and unpredictability of current climatic extremes, which are expected to further increase in intensity and frequency in the context of forecasted climate change; iii) livelihood assets, on-farm employment and household food security; and iv) active participation of the most vulnerable men and women. Successfully tested technology options will provide the basis for further replication in similar agro-ecological settings elsewhere.

Barrier #4: Lack of enterprise diversification and inadequate linkages with supply chains and loss of livelihood activities due to climate related extremes: Lack of diversification and adoption livelihood alternatives and inadequate linakges between input availability, agriculture production, and marketing is a barrier to advance adaptation. Rainfed agriculture is a major source of employment and livelihood in Nepal. Erratic rainfall patterns and increasing drought frequency are implicated in soil degradation, decline in production of traditional crops, deepening poverty and food insecurity of farming households. Direct effects of the rainy season characteristics lead to loss of soil fertility, lower production, and loss of household income. The farming households have evolved and still rely to some extent on operational changes in farming activities, spreading risks, sharing losses and other risk management strategies (sale of assets, harvesting of natural forest food). All these efforts are ad-hoc and mostly reactive emergency mode and are not sustainable.

Barrier #5: Climate impacts on crops and livestock enterprises constrains production and poses a threat to rural livelihoods depending on crop and livestock enterprises: It is against this background that donor interventions in the crop and livestock sector have been few in the past when compared to other sectors. There is a clear need, to increase action-oriented and community based adaptation with a view to developing intervention packages. The objective of the technical interventions in livestock management should be to reduce the acute pressure on pastures and feed resources by better matching livestock requirements with the natural resource base and by increasing the efficiency of conversion of the natural resources into farmers' income.

c) Additional cost reasoning (added value of the project in particular the GEF/LDCF/SCCF financing)

The additional activities requested for LDCF financing include implementing the Priority Framework for Action (PFA) and up-scaling of tested and new adaptation practices in agriculture. This is in-line with first two priority project profiles of NAPA. Emphasis will be given to address issues at the local level aiming to reduce the vulnerabilities and enhance adaptive capacity. The project will be implemented in four districts (Udayapur, Siraha, Argakhanchi and Kapilbastu) in 2 development regions (Eastern and Western). The project will be implemented by the Ministry of Agricultural Development (MOAD) along with district agricultural and livestock development offices (DADO/DLSO) under concerned departments (DOA, DLS).

The additional activities will be complementary to the baseline project activities as they will be aimed at integrating climate related concerns and priorities. The assumptions applied for additional cost reasoning refers to costs associated with the proposed activities that promote measures to cope with

the adverse impacts of climate variability and change vulnerable communities to achieve their development goals. In a way, the additional costs correspond to projected loss of development benefits due to climate change. The section below describes the additional cost reasoning and alternative scenarios that is expected through the LDCF support to create adaptation benefits in safeguarding development results against climate change impacts. ~~The additional activities will be complementary to the baseline project activities as they will be aimed at integrating climate related concerns and priorities. The additional cost reasoning is detailed below:~~

Component 1: The specific weakness of the baseline projects are that climate risks are not addressed. Without considering the underlying vulnerabilities and climate risks, the performance of the baseline interventions will not be effective. The additional financing from LDCF will be used to strengthen the technical capacity in the Ministry of Agricultural Development (MOAD) and its departments (DOA, DLS and NARC) at national and district level on climate change adaptation. This will be achieved by assessing training needs and conducting need-based training programmes. Capacity building efforts will also target Ilaka (sub-districts) field offices and Village Development Committees (VDC), and other community-based organizations. To sustain the training programmes beyond the project cycle, the training curriculum will be integrated into the DOA and DLS regular/annual training activities within their respective training divisions.

The project will coordinate with similar activities of other projects in the country so that outcomes of the proposed project can be enhanced and made more sustainable. For example, the ~~Global Agriculture and Food Security Fund, the Government of Nepal, with supervisory support from the World Bank, is formulating~~ the Agriculture and Food Security Project (AFSP) aims to ~~(see description in section B6).~~ enhance the food security of vulnerable groups enlarging the livelihoods base for farm families and to reduce food and health risks among vulnerable groups and improve income earning and employment opportunities for the poor households. This baseline project focuses on investments without considering the likely impacts of increasing climate variability and climate change.

Some of the activities under the proposed LDCF funded project, particularly agriculture based livelihood enhancement, is having similar objectives as the AFSP which will also be supporting local communities, farmer groups, producer groups in initiating activities (on and off-farm) that will directly impact their livelihood. The AFSP project will be implemented in 19 districts of Mid and Far-Western regions, and will benefit from the component 2 assessments on climate change impacts and vulnerabilities under the LDCF project. Thus, the LDCF project activities have clear focus on additional activities that have not been covered under the baseline projects. ~~among which non is selected for this LDCF project and thus potential overlaps will be avoided.~~ In addition, t~~T~~he national level capacity development activities will be carefully coordinated to enhance complementarity and synergies between the baseline projects and the LDCF.~~.~~

To ensure sustainability of the project outcomes, the capacity development activities on climate change adaptation will be systematically designed by applying Farmers Field School (FFS) approach at the local level. This activity will build on the already established Farmer Field Schools (FFS) under the baseline projects (e.g. IPM), but incorporate climate change aspects. Systematic training needs assessment will be conducted at national, district and local level to design the curriculum for training programmes. The information necessary for preparation of training resources will be drawn from the documents such as National Communications, NAPA, research reports from NARC, and project reports of FAO and other development partners. Climate data collected from DHM as part of FAO project was already analysed and handed over to the Ministry of Agricultural Development (MOAD), and the data and results of the analysis will be used for preparation of training manuals. The training curriculum and necessary resources will be integrated into ongoing and regular training programme of MOAD, DOA, DLS and NARC to ensure sustainability.

This LDCF project will strengthen the Environment Unit (Climate Change) of Food Security and Environment Division of the Ministry of Agricultural Development (MOAD) with logistic and technical support, enabling the supervision of climate change adaptation activities. It will also seek to

establish a mechanism for information exchange, collaboration, coordination between Ministry of Agricultural Development (MOAD), Ministry of Science Technology and Environment (MOSTE) and Ministry of Finance (GEF focal ministry) with regard to climate change.

Component 2: The LDCF resources will be used to improve databases, tools and methods for vulnerability and risk assessment and to define the hotspots of vulnerability (current and future) in agriculture sector. The LDCF project will improve the capacities of more than 20 governmental staff at the national level, training them on assessment tools and methods under the Training of Trainer's (ToT) model, to ensure sustainability. The LDCF project will be built on previous FAO's field experiences and will improve the quality of agro-meteorological advisories to farmers. At present, the Department of Hydrology and Meteorology is providing 24 hour forecast to 17 stations in the country; and it is expected that the PPCR project would aim to improve the lead time, timeliness and accuracy of the forecasts. This LDCF project will make use of the existing forecasts and also the new information products planned to be developed under the PPCR project for application at local level focusing specifically on agriculture sector. The LDCF resources will contribute to strengthening agro-climate monitoring infrastructure in selected 4 districts in close coordination with PPCR and strengthen the expertise of district agricultural extension officers to interpret and use the climate data and information for decision making.

This LDCF project will strengthen the technical capacity of the Government agencies for agricultural and livestock services at district level (4 districts) to interpret weather and climate information and agro-meteorological information to be developed under the Component D: Agriculture Management Information System (AMIS) of PPCR project. This additional activity of the LDCF is relevant even with dissemination of currently available weather information (24 hrs) as this is not being applied for securing agricultural livelihoods at the local level. The LDCF will focus on strengthening of the current crop monitoring work of the Agribusiness Promotion and Statistics Division (ABPSD) of the Ministry of Agricultural Development and focus on application of information products at local level with farmers through Farmers Field Schools (FFS).

The~~is~~ training activities under the component 2 focuses only on specific aspects of risk and vulnerability assessment and application of weather, climate and agro-meteorological information and decision making, while the trainings under component 1 focuses on broader climate change adaptation. Government staff working for the co-financing projects is expected to participate in the training programmes to ensure introduction of climate resilience into the baseline and co-financing projects. Thus, the LDCF financing specifically targets additionality aspects with a view to promote vulnerability reduction and adaptive capacity to better manage climate related risks.

The weather and climate information will be disseminated at the village level through the Farmer Field Schools (FFS) already implemented by the baseline projects to ensure sustainability. The FAO project concluded in December 2011 on "climate change adaptation (CCA) and disaster risk management (DRM) for sustainable livelihoods in agriculture sector" supported up-gradation of 5 selected agro-meteorological observatories between 2008 and 2011 on pilot scale, but requires additional instruments. This LDCF project will focus on further up-gradation of 5 agro-meteorological observatories one each in Siraha, Udayapur, Kapilbastu, Argakhanchi. This activity will be coordinated with the component B (Modernization of the Observation Networks and Forecasting) of the PPCR project.

Component 3: The main objective of this component is to build a culture of innovation, and resilience, and to institutionalize awareness-raising on climate change adaptation. The expected outputs of Component 3 financed by the LDCF resources will include: i) Farmers Field School (FFS) approach implemented with at least 120 Farmers' Groups in 4 districts and have sessions relevant to climate change adaptation; ii) packaging of at least 25 successfully tested and replicable adaptation practices; and iv) packaging of information on at least 5-6 new varieties of fruit trees or multi-purpose tree species suitable for reducing the climate related risks under changing conditions. The project will facilitate the formulation of awareness-raising, knowledge management and communication strategies,

and their implementation through campaigns, field days and farmer exchange visits. The good practice examples will be screened based on the indicators: environment friendliness, potential to reduce the impacts of climate risks, economic viability, sustainability, social acceptability, gender sensitivity, income generation, enterprise diversification, seasonal relevance and community's need. Screening of good practices examples for adaptation and packaging them through knowledge management portals and documents forms the additional activities that has not been covered under the baseline projects.

Component 4: The LDCF project will mobilize the local communities at village development committees (VDCs) to formulate **Local Adaptation Plans of Action (LAPA)** with an aim to prioritize local small-scale investments for strengthening livelihood assets, sources of income and for transfer of relevant adaptation technology for reducing climate risks. Prioritization of local/small scale investments and adaptation activities and subsequent implementation will be achieved by following Community Based Adaptation (CBA) and participatory tools and methods such as transect, risk and vulnerability mapping, hazard calendar, cropping calendar, matrix ranking, venn diagram and problem tree. The LDCF funding for these activities will be highly appropriate and additional that provides alternate livelihoods and income sources to vulnerable communities. The approach will be highly cost-effective and efficient as adaptation investments will be streamlined through the existing community networks, and will mobilize existing functional farmers' groups/CBOs (Community-based Organizations). The LDCF project will promote sustainable, climate-resilient adaptation practices against climate change impacts in crop-agriculture and livestock sub-sectors to prepare and implement LAPAs in at least 24 VDCs covering 4 districts in 2 development regions. This proposed project will also include over 120 large-scale field demonstrations of new crop and fodder varieties in 5 agriculture seasons that has not been covered as part of the baseline projects and thus the investments under component 4 are considered additional.

The LAPA's investment priorities will incorporate climate risk management and adaptation practices in farming (soil and water conservation practices, water harvesting techniques, management of degraded land and community resources, sloping agricultural land technologies (SALT), off-season vegetable production, alternative livelihood options, risk-related seed storage and processing), agro-forestry (bioengineering for river bank protection, multi-purpose tree species, tree-crop alley farming systems) and livestock (improved livestock management, drought tolerant fodder species, vaccination, etc.,) sectors. Field implementation of livelihood alternatives, climate resilient physical measures to improve livelihood assets and sources of income, transfer of adaptation technology relevant to agriculture and new stress tolerant varieties are expected to produce at least 25 innovative case studies to be integrated into national sectoral strategies (linked to component 1 and 3 of this project) and plans for up-scaling to similar areas in the country.

1.1.2 FAO's comparative advantage

FAO has been implementing several projects in Nepal in the field of agriculture, food security, climate risk management, disaster preparedness and emergency response. FAO's comparative advantage for the proposed project lies in its long-standing experiences working with Government agencies and more specifically with the Ministry of Agricultural Development (MOAD) on issues related to climate variability and climate change. Several FAO's programmes are complementary to the proposed project and will build on already established institutional systems.

The project draws on lessons learned from two projects technically assisted by FAO: (i) FAO assisted the Government of Nepal between 2008 and 2010 for strengthening capacity for climate risk management and disaster preparedness (TCP/3201 (D)) in agriculture sector through its Technical Cooperation Programme (TCP). Through this project, FAO has supported identification of agriculture and food security related priorities for NAPA by the Thematic Working Group (TWG) on Agriculture and Food Security. The project included development of technical and institutional capacity, preparation of national priority framework for action on climate change and disaster risk management; preparation of district level risk management plans, and demonstration of risk reduction and adaptation practices in four districts covering 12 village development committees (VDCs); (ii) FAO had

implemented FAO-UNDP Joint Programme on climate change adaptation and sustainable livelihoods for two years (2010-2011). This programme is closely linked to FAO TCP project, but covered additional district cluster covering one district in *Terai* and another in mid-hills.

FAO's activities are guided by a clear targeting policy which ensures that they reach poor rural women and men, who are usually the most vulnerable to climate change. FAO's operations are consistent with the national priorities especially on sustainable agriculture and food security. The proposed project matches with the FAO's comparative advantage in capacity development in agriculture sector. FAO has been supporting Nepal's efforts to develop more resilient agriculture systems and national food security strategies. Technical support will be provided locally from the national level expertise and also from the FAO Regional Office for Asia and the Pacific (FAORAP) in Bangkok and from the climate impact and adaptation team of the Climate, Energy and Tenure Division (NRC) in FAO headquarters.

1.1.3 Participants and other stakeholders

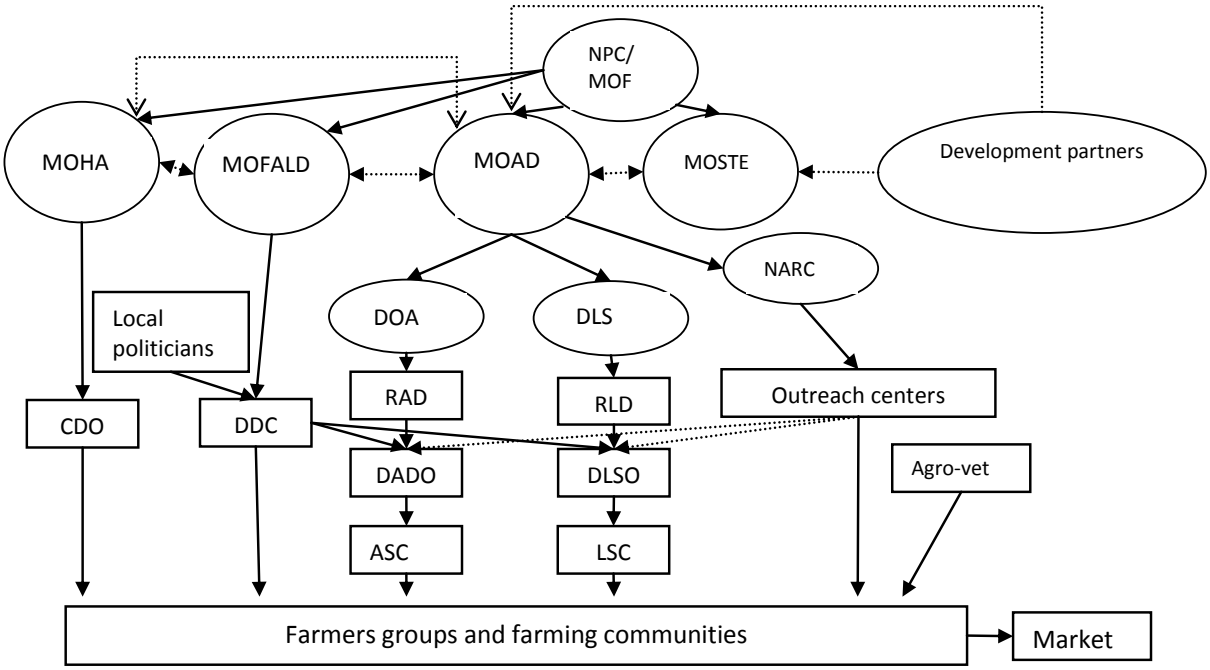
Government agencies, donor agencies, input suppliers, output markets and farming communities have direct stake or interest over the adaptation to the climate change in agriculture. The consultations leading to this project formulation have identified a number of stakeholders and are presented in Table 2.

Table 2: Major attributes of the main stakeholders relevant to climate change adaptation in agriculture

Stakeholders	Position/relevance	Level of influence	Level of interest	Group/coalition belong to
MOAD	Very high position in agricultural production	High level of influence on adaptation in agriculture	Interest in food security and agricultural commercialization	Government
NPC	Very high in programme coordination	High policy influence	Economic development and growth	Government
MOF	Very high level in resource control	High level influence in resource allocation, flow and foreign aid tracking	Reducing budget deficit, increasing revenues and economic growth	Government
MOSTE	Very high position in climate change adaptation	High level of influence on adaptation in general	Protection of environment	Government
MOFALD	Very high position in local development	High level of influence on local level planning	Smooth functioning of local governments	Government
MOHA	Very high in disaster related actions	High level of influence on mobilization of resources	Law and order maintenance and rescue	Government
NARC	Governed by the Council and coordinated by MOAD	High level of influence on through technology generation	Knowledge and technology generation	Autonomous
DOA	Controlled by MOAD	Nationwide network for technology extension	Increasing agri. production	Government
DLS	Controlled by MOAD	Nationwide network for technology extension	Increasing livestock and poultry production	Government
RAD	Controlled by DAO	Monitoring of district level programs	Increasing agri. production	Government
RLD	Controlled by DLS	Monitoring of district level programs	Increasing livestock and poultry production	Government
DDC	Coordinated by MOFALD	High influence in programme planning and monitoring	Overall development of the district including agriculture	Local Government
DADO	Controlled by DOA, monitored by RAD and coordinated by	High influence in agricultural development and adaptation	Increasing agri. production	Government

Stakeholders	Position/relevance	Level of influence	Level of interest	Group/coalition belong to
	DDC			
DLSO	Controlled by DLS, monitored by RLD and coordinated by DDC	High influence in livestock and poultry development and adaptation	Increasing livestock and poultry production	Government
Agriculture Service Centers	Controlled by DADO	High influence at the farmers level	Increase technology adaptation	Government
Livestock Service Centers	Controlled by DLSO	High influence at the farmers level	Increase technology adaptation and disease treatment	Government
Outreach centers	Controlled by NARC	Influence in technology generation and adoption		
CDO	Controlled by MOHA	High level of influence on law and order	Monitor district & local level government offices and coordinate disaster relief works	Government
Local politicians	Guided by their respective political parties	Can influence programme planning and implementation	Popularity among the people	Political
Agro-vet	Several agro-vets in the district with little market power	Can influence in input supply and technology suitable for adaptation	Earning profit and business reputation	Private
Agricultural produce market	High concentration of a few output markets	Can influence adaptation through derived demand for agricultural products	Earning profit and business reputation	Private
Farmers groups and farmers	Low position in economic and political hierarchy	Can play a great role in adaptation	Earning livelihoods	Community
Development partners	Hold resources for climate change adaptation	Can influence resource allocation and flows	Development of the country and their reputation	International community

These attributes of the stakeholders are identified through discussions with key informants, including interviews with agencies and discussion with farmers in all the four project district and selected VDCs. Technicians working in the area and local politicians are consulted. Prior to the field visit, detailed review of background literature and country studies were carried out to understand the country's political economy. Thereafter, major stakeholders including development partners at the national level were consulted. These attributes exhibit the ability the stakeholders support or hinder the climate change adaption in the project areas. The relative positions of the stakeholders are mapped in Figure 1.



Legends: Circle: central level; rectangle: regional or local level; solid line with arrow: administrative or resource control; dotted line with arrow: cooperation; dotted line with two way arrows: coordination.

Figure 1: Stakeholder mapping with a schematic of national ministries and their reach to the local communities through their respective institutions at the local level

Different agencies are putting efforts in climate change adaptation in agriculture in Nepal. The agencies and their major roles relating to climate change adaptation are elaborated in the table 3.

Table 3. Mapping of agencies involved in climate change adaptation in agriculture

Agency	Major functions related to the project activities
MOAD	Environment Section established in the departments. Budget programme guidelines for the coming year include programming for climate change adaptation. GIS section implements PPCR to develop agriculture marketing information system (AMIS) web portal and meteorological and hydrological facilities for weather forecast and rainfall predictions based on information from DHM.
DOA	Transfers crop and fisheries production technologies to the farmers through a nation-wide network of regional and district level offices and service centres.
DLS	Provides diseases treatment services and transfers technology for livestock and poultry production through a nation-wide network of regional and district level offices and service centres.
NARC	It will obtain real time data from 3 stations in Kathmandu, Nepalganj, Lumle and will develop agro-advisory package bulletin under PPCR. The package will be disseminated through printed matter, SMS notice board service, FM channel, agro-call centers and digital display.
IWRMP	IWRMP has a component Integrated Crop and Water Management Program being jointly implemented by DOA and DOI. This project is to provide a package of modernized agriculture practices and institutional support for both on-farm and off-farm rural population towards achieving optimal level of agricultural production, reduction in rural poverty, enhancement of farm and off-farm income and food security. The project is implemented in 44 districts and two districts namely Argakhanchi and Kapilbastu are overlapping districts. The activities in tail areas of the canal includes FFS, drought resistant varieties, plastic pond, water harvesting, drip irrigation, lift irrigation, matching grants, seed production, vegetable production and agricultural machineries.
MOSTE	Is working as the national focal point for all climate related activities
DHM	This department is to provide hydrometeorological information for AMIS under PPCR, but the parameters are yet to be identified.
Practical	Working in the areas of resilient agriculture concept and vulnerability since 2005. It's

Agency	Major functions related to the project activities
Action	developing a climate smart village in Nawalparasi district. Rainfall forecast information is provided to the community and helped in preparedness and management.
World Bank	Related projects of the World Bank include: PPCR, AMIS- data collection, information, AFSP – for technology development for adaptation and technology transfer, IWRMP – for modernization and rehabilitation of irrigation structures; institutional strengthening; and agriculture, FFS, climate smart agriculture- demonstration. Not much different between regular, PACT-- based on value chain, business incubation center in process, climate forecast can be helpful for commercial farms, PAF- livelihood, but weak in technology and Heifer International – livestock development.
ICIMOD	Implementing HICAP (High Himalaya Climate Adaptation Programme) for hydrometeorology and climate management. Koshi Basin Project- Udayapur is overlapping district. The main issue is how to take the regional climate prediction models to the household level. HIMALICA (Rural Livelihoods and Climate Change Adaptation in the Himalayas) aims to support poor and vulnerable mountain communities in the Hindu Kush Himalayan region in mitigating and adapting to climate change. AdaptHimal focuses on livelihoods and ecosystem services in the Himalayas through enhancing adaptive capacity and resilience of the poor to climate and socioeconomic changes. This is to assess the impacts of climate and socioeconomic changes on the poor and identify adaptation and coping mechanisms. Drought monitoring and prediction through SERFVIR Himalayas, good for planners. Synergies can be in piloting climate smart village, mainstreaming CCA at district level planning and developing training modules for climate adaptation
Climate Change Network Nepal	Its scope covers informing, influencing, empowering and to some extent influencing. It develops common understanding and prepares positions for global Climate negotiations. It assists the government before the COP about how to negotiate. At sub national level it has partners NGONCC (NGO network in climate change) with secretariat in LIBIRD, Pokhara. Key lessons from the district level include: i) very low level of awareness about what happening at the central level; ii) people interested to work; iii) coordination mechanisms are not enough. Coordination is necessary and it can be done by DDC supported by MOFALD.
EC Delegation	Nepal climate Change Support Programme in 14 districts, rural Development, Food Security IDE implementing CCA in Nawalparasi , USAID: Climate change adaptation and technology transfer in Mid and Far Western Development region, started in 2013 for 3 years
MOFALD	LAPA Process and CRMP lead to Disaster Risk Reduction Centre (DRRC). DRR policy – compiled in process. Resource mobilization guidelines. Developed 14 steps local government planning process. LAPA implementation started in 69 VCDs but have practical problems.
RRCN	Risk Reduction Consortium Nepal is for all the hazards and climate change as a part of DRM. Among the five flagship programmes flood risk management in Koshi River Basin and community based disaster risk management are concerned with climate change adaptation.
NPC	13^{th} plan has incorporated food security and climate resiliency in agriculture. NPC is ready to help for the project and coordination among cross cutting ministries It has developed Climate Change Resilient Planning Framework that gives some questions helpful in risk ranking. Also developed a separate budget code for climate change research budget
MOHA	Constituted Central Disaster Rescue Committee. Designated the Chief District Officer in the districts as the Chief of DDRC. It also works for food security during disaster (drought, flood, fire).
DOI	Provides irrigation to increase resiliency.
DAT/ DOA	Directorate of Agriculture Training has incorporated one session in climate change in its training. Each RATC organizes 10 to 12 training in a year for Junior staffs, farmers and even private sector/NGO. It also provides 51 working days Village Agricultural Workers training with objective of covering all 3915 villages.
IDE Nepal	IDE is implementing Initiative for Climate Change Adaptation (2012- 2017) funded by USAID. The $ 2 million project is to improve climate change planning and develop resilient income streams for 20,000 households in 8 districts (Nawalparasi, Rupandehi, Kapilbastu, Dang, Kaski, Parbat, Syangja and Rolpa) in western and mid-west development region of Nepal.
USAID	Initiative for Climate Change Adaptation (ICCA) implemented by iDE, Rupantaran and RIMS-Nepal supports communities to adapt to adverse climate change impacts. It is to identify and facilitate suitable adaptation interventions, innovations, and technologies to enhance capacity of the community to improve livelihoods. It helps to develop and implement LAPA and establish Community Climate Resource Centers (CCRC). Hariyoban project for capacity building for climate change adaptation using tools alike early warning, awareness building, understanding,

Agency	Major functions related to the project activities
	vulnerability assessment.

1.1.4 Lessons learned from past and related work including evaluations

Growing vulnerability to floods, droughts, landslides, heat waves and animal/plant pests and diseases are the main threats to agriculture and food security in Nepal. Agriculture is the principal economic sector, on which nearly 78 percent of households depend, but it is poorly diversified and largely dependent on variable monsoons. Most farms are small, and there has been little adoption of modern technology because of under resourced agricultural support services and weak supply of agricultural inputs.

Institutional support has focused on responses to climate risks, and lacks initiatives on proactive risk management and resilience. Within the agriculture sector there are limited structures and resources for proactive climate risk management and adaptation to climate change. Strengthening of these areas will require coordinated efforts at the national and local levels. Initiatives by MOAD, especially DOA, DLS, NARC, and regional and district agriculture and livestock development offices are critical to the mainstreaming of risk management and climate change adaptation into agriculture. Broader collaboration with other ministries and departments is also fundamental. Inter-ministerial mechanisms established during the project period (e.g., the steering committee) were effective, but efforts are needed to sustain these mechanisms to enhance future collaboration and coordination.

Institutional and technical capacity development is the key priority for improving MOAD's position as a key player in adaptation in agriculture. Capacity development at all levels of MOAD is required to implement the climate risk management activities of the NSDRM and to mainstream adaptation into the ministry's sustainable agricultural and rural development planning. Institutional and technical capacity needs to be enhanced at the national and district levels, particularly in DOA and DLS, to ensure that climate risk management and climate change adaptation are addressed proactively and from an agricultural perspective. The institutional framework of the NSDRM recognizes the importance of agriculture, and the NAPA identifies several priority action areas related to the agriculture sector. Building institutional and technical capacity will also provide MOAD with a comparative advantage in representing the agriculture sector in national-level adaptation initiatives facilitated by the Ministry of Science Technology and Environment (MOSTE).

Additional efforts are needed to mainstream institutional and technical capacity development activities within MOAD. At present, capacity building activities are fragmented and insufficient to meet the needs of the large DOA and DLS staff at the national and district levels. Currently, capacity development activities are mainly at the national level, with selected participants from the districts; capacity development at the district level is usually related to the preparation of DDRMPs. Farmers receive specific training programmes on improved agricultural practices as part of field demonstrations. The sustainability of MOAD capacity development activities at the national and district levels is limited due to the frequent transfer of staff members, and there are very limited efforts to strengthen the capacity of agricultural service centres. Further efforts in this regard should ensure sustainability by mainstreaming capacity building activities into the institutional system.

Data and information about climate change impacts and vulnerabilities must be systematically assessed and managed to help develop adaptation strategies for agriculture. Existing assessments focus on current risks and employ a livelihood perspective to assess location-specific risks and vulnerabilities. As climate change scenarios become increasingly available, model-based impact assessments in line with the NAPA priorities will provide objective vulnerability, risk and impact assessments to facilitate implementation of the adaptation practices identified through the NAPA process.

Currently available weather and climate information and early warning systems offer some opportunities, but are insufficient for managing climate risks proactively. The risk management

approach focusing on farm management strategies can enhance the adaptive capacity and resilience of farmers to the anticipated future impacts of climate change. Building on existing weather and climate information, innovative information products tailored to the needs of local farmers can increase lead times for flood and drought warnings, facilitating farmers' decision-making and improving their choice of crops and other management practices. On-going efforts seek to enhance the capacity of agricultural support services and local organizations to understand climate change impacts, vulnerabilities and adaptation. However, further efforts are needed to develop the current 24-hour forecasts into longer-term forecasts, which would help to expand the scope of weather and climate information from its current focus on life saving to include better safeguarding of people's livelihoods.

Climate change adaptation interventions must focus on community needs. As climate change impacts and adaptation are location-specific, interventions for the local level require the introduction and demonstration of innovative adaptation options through a guided learning-by-doing process at the district and community levels. The community-based adaptation approach has been tested through the FAO Technical Cooperation Programme project, and efforts are now needed in all risk-prone districts to disseminate locally adapted, innovative and gender-sensitive technologies for climate change adaptation in the agriculture sector. This process will enhance local awareness of adaptation to climate variability and change and resilience to the impacts and unpredictability of current climatic extremes. As MOAD is participating in on going community-based adaptation initiatives, its agencies are well placed to scale up climate change adaptation and climate risk management and adaptation initiatives in all risk-prone districts. Climate change policy (2011) and local adaptation plan of action (LAPA) provides a basis to focus on community-level actions.

Local inclusion can help communities gain access to livelihood assets, articulate their needs, and enhance adaptive capacity. Institutions support farmers' groups in improving farming practices, but poor and vulnerable people are often excluded from these groups. Participants in focus group discussions reported that the leaders of farmers' groups are in the front line for receiving benefits, and resources are not distributed equitably to the most vulnerable communities. Experiences suggest that social inclusion and gender considerations are crucial to achieve desired impacts from climate risk management and adaptation interventions.

Enhanced policy advocacy is needed to ensure the scale-up and sustainability of locally tested risk management and adaptation practices. The technologies demonstrated by the pilot projects were either developed by or familiar to the government institutions but not to farmers. Although these practices have a climate risk management and an adaptation focus, they are not much different from business-as-usual agricultural technologies. There are many practices proven to reduce the climate risks significantly and enhance the opportunities for yield increase. Some practices were adopted through observation by farmers, but interventions have not yet been scaled up. The resources are not enough for immediate replication by district authorities, which lack both institutional and technical capacity. Future interventions can make use of tested practices for replication with additional resources from donor agencies and the government.

There are many donor- and government-funded programmes and projects in agriculture and food security, but few include climate change concerns. Very few projects have major objectives and activities related to climate risk management and adaptation. Government budget allocations to the agriculture sector have remained stagnant for years, dropping from about 4 percent in 2001/2002 to 2.41 percent in 2003/2004, before rising again to 3.76 percent in 2014/2015. This budget is marginal compared with agriculture's share of total GDP.

Poor coordination and linkages among CBOs, NGOs and government organizations are a major impediment to advance risk management and adaptation. Institutions and development partners at the local level work in isolation although there are ample opportunities for working with other institutions to share lessons and use resources for synergy. For example, improved coordination and collaboration between the District Forestry Office (DFO) and the District Livestock Service Office (DLSO) can enhance outcomes of the grazing land and pasture improvement programmes in forests. Similarly, at

the village level, coordination between CFUGs and WUAs can improve efficient use of forest resources and enhance the potential for improving the livelihoods of both women and men in risk-prone areas.

Better coordination at the district level is necessary to ensure effective implementation of risk management and adaptation measures. Support is needed to ensure the integration of agriculture issues into district-level risk reduction actions. FAO has supported the integration of agriculture sector perspectives into the DDRMPs in four districts, but many of the most vulnerable districts do not have overall risk management and adaptation plans in place. As responsibility for broader risk management at the district level rests with the district disaster management committee, further efforts are needed to integrate climate risk management and climate change adaptation into these plans. DDRMPs have not been fully implemented as there are insufficient resources for the numerous priority activities, each of which requires significant inputs to achieve any meaningful results. Many NGOs working at the district level are contributing to these priority activities and have been involved in the planning process, but enhanced coordination is needed.

Increased commitment to climate risk management and adaptation at the national level will offer opportunities for building resilience in the agriculture sector. Climate variability and climate change concerns have not yet been fully integrated into Nepal's agriculture policy and planning processes. Despite activities implemented by the government and NGOs, dedicated and predictable budget allocations for climate risk management and adaptation to climate change in the agriculture sector are lacking. FAO's technical assistance has promoted opportunities for aligning agriculture sector plans with the NSDRM and the NAPA, including by facilitating national consultations and providing technical support for preparation of the ten-year PFA. The government is committed to implement the PFA, but continuing efforts are needed for systematically addressing all the priorities through government funding and donor support.

1.1.5 Links to national development goals, strategies, plans, policy and legislation, GEF/LDCF/SCCF and FAO's Strategic Objectives

Links to national development goals, plans, policy and legislation

The project is consistent with Nepal's **First National Communication to the UNFCCC (2004)**. Some of the priorities outlined in the document and closely related to the project components are: develop and familiarize drought tolerant varieties of crops, promoting traditional and indigenous practices to reduce the impacts of climate change, assess the impact of climate change on crops and develop forecasting systems, identify agro-ecological zones particularly sensitive to climate change impacts and vulnerable areas, promote efficient utilization and conservation of water and promote adaptive farming systems.

The project is in line with the priorities and needs identified under the **National Adaptation Programme of Action (NAPA)** (September 2010), National Strategy for Disaster Risk Management (NSDRM – March 2008) and **National Agriculture Sector Development Priority (NASDP)** for the Medium-Term (2010/11 - 2014/15). The project focuses on proposed activities of the NAPA priority project profile 1 (Promoting community based adaptation through integrated management of agriculture, water, forests and biodiversity sector) and the priority project profile 2 (Building and enhancing adaptive capacity of vulnerable communities through improved system and access to services related to agriculture development). FAO, through its technical assistance programme to the Government of Nepal, has supported formulation of NAPA priority project profile on climate change adaptation in agriculture and food security through a broad consultation process. A brief account of the strategies, plans, reports and documents that outlines the immediate and long term needs of Nepal in agriculture is described below:

Priority Framework of Action (2011 – 2020) (PFA)[9] on Climate Change Adaptation and Disaster Risk Management is a comprehensive priority framework to support and provide strategic direction to the Ministry of Agricultural Development (MOAD), its technical services and agencies for the implementation of Climate Change Adaptation and Disaster Risk Management (DRM) in Agriculture and allied sectors. The framework was prepared and endorsed by the Government in 2011. Experience gained from FAO's assistance through a project (TCP/NEP/3201) on "strengthening capacities for disaster preparedness and climate risk management in the agriculture sector", especially field level activities, provided much information in the identification of priorities. The PFA identifies five major priority areas: (i) Strengthening institutions, policy and coordination; (ii) Assessing and monitoring climate risks and vulnerabilities; (iii) Improved knowledge management, database and awareness raising; (iv) Implementing technical options by integrating community based approaches; and (v) Strengthening capacities for effective risk preparedness, response and rehabilitation

Along the same line, the proposed LDCF project explicitly contributes to priority areas I, II, III and IV detailed above. As the PFA will be implemented by concerned line agencies, ministries and departments (e.g. MOAD, NARC, DOA, DLS and DHM), the same implementation arrangement will be considered for implementing this LDCF project.

Agricultural growth is a major priority in the **Tenth Plan** and continued in the ensuing **Three Year Interim Plan** (2007/08 – 2009/10) and current Three Years Plan (2010/11-2012/13). This three year Plan envisaged agricultural growth to increase by 3.9 % , as well as a reduction in food insecurity and malnutrition. Identified means to enable growth include: diversification and commercialization; enhanced supply and access to resources including irrigation, fertilizers; and improving market linkages. This project will contribute to diversification of livelihood activities and access to livelihood resources with a view to reduce vulnerability to climate risks and enhances adaptive capacity.

The plan also distinguishes the importance of disaster risk reduction, emphasizes the need to introduce changes into the prevailing national policies for the required shift of focus from disaster response to prevention, and preparedness, identifies challenges such as the need to foster coordination among the institutions, and seeks to promote better understanding of climate risks. The plan recognizes existing gaps such as the lack of institutional capacities at various levels, and emphasizes the need for systematic risk and vulnerability mapping, enhancing public awareness and technical capacities for climate risk assessment. These needs are taken into account under the project component 2 "Assessment, monitoring and providing adavance early warning systems on vulnerabilities and risks to assist better adaptation planning at national, district and local levels".

The **National Agriculture Sector Development Priority (NASDP)** (2010/11 - 2014/15) acknowledged the importance of adaptation to climate change effects. The NASDP stresses the limited capacity for adaptation to climate change effects. The problems focused are irregular rainfalls, floods, droughts, cold waves, landslides and new pests and diseases. As these factors directly affect food production, the priority suggests that the country needs to enhance its capacity with adequate attention on vagaries of climate change effects in agriculture.

The Government of Nepal had brought into force the **National Agricultural Policy (2004),** which takes into consideration aspects that are related to Climate Change Adaptation and Disaster Risk Management. One of the relevant priority is to enhance the capacity to assess the impact of heavy rainfall, droughts, diseases, insects and other natural calamities. This project (component 1 and 2) will support to deliver relevant tools and methods for impact assessment and monitoring.

Nepal's **National Strategy for Disaster Risk Management (NSDRM)** endorsed in 2008 is closely oriented along the lines of the Hyogo Framework for Action (HFA) and it implies a major shift in government policies away from an emergency response driven way of working toward a disaster risk

[9] Ministry of Agricultural Development (2011). Priority Framework for Action – Climate Change Adaptation and Disaster Risk Management in Agriculture. Government of Nepal, Kathmandu, Nepal.

management perspective, which puts equal emphasis on prevention, and preparedness, highlights the links between disaster management and development, as well as the cross sectoral responsibilities. The agriculture component of the strategy has five pillars similar to one described above under priority framework for action.

Links to FAO's Strategic Objectives

This Project is aligned with FAO's Global Strategic Objective 2 (SO2)**: Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner**. The Project's focus to help local forest user groups improve their forest management practices while benefiting their own livelihoods will contribute in particular Organizational Outcome 1 (OO1) under SO2: Producers and Natural Resource Managers Adopt Practices that Increase and Improve the Provision of Goods and Services in the Agricultural Sector Production Systems in a Sustainable Manner. In addition, the Project's work to strengthen the relevant policy framework in Nepal will contribute to SO2, OO2: Stakeholders in member countries strengthen governance – the policies, laws, management frameworks and institutions that are needed to support producers and resource managers – in the transition to sustainable agricultural sector production system. It is also aligned to SO5: Increase the resilience of livelihoods to threats and crises. The project contributes to increased resilience of livelihoods to threats and crises OO2 under SO5: Countries and regions deliver regular information and trigger timely actions against potential, known and emerging threats to agriculture, food, and nutrition.

The project fit into FAO-Adapt, an organization-wide framework programme launched in 2011. It provides general guidance and introduces principles as well as priority themes, actions and implementation support to FAO's multi-disciplinary activities for climate change adaptation. FAO-Adapt provide an umbrella to FAO's adaptation activities, including short-term and long-term adaptation measures. FAO-Adapt aim to enhance coordination, efficiency and visibility of FAO's adaptation work. FAO's Interdepartmental Working Group (IDWG) on Climate Change and its subgroup on adaptation facilitate the implementation process of FAO-Adapt. Technical units in FAO Headquarters and decentralized offices lead the delivery of outputs and actions consolidated under the priority themes defined in the FAO-Adapt Framework Programme.

The Project is also aligned to, and contributing to, the "*FAO Country Programming Framework (CPF) (2013-2017)"*. In particular, it will contribute to the CPF's CPF Priority Area 4. Natural resource conservation and utilization including adaptation to climate change. The outcome 4.3 is related to climate change and institutional and technical capacities for adaptation to climate change in agriculture strengthened and adaptive capacity of vulnerable communities enhanced.

This includes 4 outputs: *Output 4.3.1: Improved policy advice and institutional capacity building:* Capacity building of national (institutions for climate change adaptation and policy advice and guidance in the integration of climate change priorities into agriculture and food security policies, programmes and action plans and support in the implementation of prioritized adaptation practices under the National Adaptation Programme of Action (NAPA)); *Output 4.3.2: Improved assessment, monitoring, disaster risk management (*Support in assessment and monitoring of climate risks and vulnerabilities, improvement of early warning systems and strengthening of capacities, and procedures for effective disaster risk management at all levels with emphasis on community based disaster risk management and facilitates integration to the longer-term climate change adaptation initiatives; *Output 4.3.3: Improved community based adaptation approaches* to climate change in vulnerable districts and capacity building of local communities in the adoption of improved production practices, including adaptation innovations through ecosystem management and improved pasture, rangeland management and rehabilitation of degraded lands, promotion of Public Land and Private Land plantation and agro forestry to enhance coping capacity of farmers, and promotion of alternative energy sources and *Output 4.3.4: Improved knowledge management,* database of good practices, database on agriculture impacts of climate change on agriculture.

SECTION 2 – PROJECT FRAMEWORK AND EXPECTED RESULTS

2.1 PROJECT STRATEGY

The proposed project is consistent with the LDCF results framework, objectives, expected outcomes, core outputs and relevant indicators. The adaptation benefits and additional cost for which the LDCF resources are requested and specific adaptation activities will increase the climate resilience of the defined baseline activities. The project proposal targets the first two priorities of the NAPA Priority Profile of the Government of Nepal, which are related to agriculture. It will also create an implementation and coordination mechanism in line with the recently evolved Priority Framework for Action (PFA) on Climate Change Adaptation endorsed by the Government of Nepal.

This project strategy focuses the key elements of GEF LDCF objective CCA-1 on reducing vulnerability to adverse impacts of climate change and objective CCA-2 on increasing adaptive capacity to respond to the impacts of climate change and CCA-3 on adaptation technology transfer. The project will work in line with GEF strategy to promote sustainable development by supporting climate change adaptation as well as enhancing productivity in agriculture sector.

The strategy of the project is to promote adaptation measures at local level to reduce risks to economic losses and diversify and strengthen livelihoods and their sources of income. This approach is in-line with Nepal's climate change policy that more than 80% of the resources should be delivered at the level of direct beneficiaries. The practices are aimed to reduce climate change risks and vulnerabilities in a cost-efficient way to deliver adaptation benefits. The project will follow the results based management and programmatic approach of GEF/LDCF in addressing climate change adaptation on the ground, scaling-up of climate resilient measures and mainstreaming them into policy and planning processes. All major on going and pipeline initiatives of the Government and development partners are taken into consideration to enhance synergies and to avoid potential duplications.

2.2 PROJECT OBJECTIVES

The overall goal of the project is to support the Nepal agriculture sector to become climate resilient by promoting urgent and immediate adaptation measures and integration of adaptation priorities outlined in the NAPA into agriculture sectorial policies, plans, programmes and local actions. The overall objective of the project is "to strengthen institutional and technical capacities for reducing vulnerability and promoting climate-resilient practices, strategies and plans for effectively responding to the impacts of climate change and variability in agriculture sector."

2.3 EXPECTED PROJECT OUTCOMES

The project framework below outlines four components and is aligned with the LCDF outcomes. Project Component 1: Strengthening of technical and institutional capacities and integrating adaptation into national food and agriculture policies, strategies and plans will contribute to objective CCA-1, outcomes 1.1 and 2.2. Component 2: Assessment, monitoring and providing advance early warning information on vulnerabilities risks and agro-meteorological forecasts will contribute to CCA-2 on increasing adaptive capacity, outcome 2.1. Project Component 3: Improving awareness, knowledge and communication on climate impacts and adaptation contribute to CCA-2, outcome 2.1 relevant to strengthening of systems to disseminate timely risk information. Project Component 4 on promoting community based adaptation and strengthening livelihood strategies contributes to objective CCA-3 outcome 3.1.

2.4 PROJECT COMPONENTS AND OUTPUTS

Component 1: Strengthening of technical and institutional capacities and integrating adaptation into national food and agriculture policies, strategies and plans

Outcome 1.1 Strengthened technical capacity in Ministry of Agricultural Development (MOAD), Department of Agriculture (DOA), Department of Livestock Services (DLS) and Nepal Agriculture Research Council (NARC) and local stakeholders on climate change adaptation

Output 1.1.1: Capacity development programme implemented at national and district level to enhance technical capacity on climate change adaptation (at least 50 national and 200 district level staff trained and training manuals developed and integrated into MOAD's regular activities

Technical capacity of staff in MOAD, DOA, DLS and NARC at the national level strengthened (50 staff trained) for implementation of climate change adaptation priorities identified for food and agriculture sector in NAPA. The consultations during the project preparation provided some priorities for capacity development. This includes familiarization of adaptation practices identified through NAPA sectoral working groups and prioritization of location specific adaptation practices suitable for terai and mid-hill eco-regions. The assessment also prioritized for a training on planning for community based adaptation. However, the detailed capacity deelopment activitiy will be designed based on the detailed needs assessment at national and district levels. To sustain the training programmes beyond the project cycle, the training curriculum will be integrated into the DOA and DLS regular/annual training activities within their respective training divisions.

The project will coordinate with similar activities of other projects in the country so that outcomes of the proposed project can be enhanced and made more sustainable. For example, the Global Agriculture and Food Security Fund, the Government of Nepal, with supervisory support from the World Bank has initiated the Agriculture and Food Security Project (AFSP). The national level capacity development activities will be carefully coordinated to enhance complementarity and synergies. The main activity of this output will be delivery of training to the selected trainees in two phases (first year and refresher training in third year).

At the district level, technical expertise of DOA and DLS staff on climate change adaptation will be improved by implementing Training of Trainers (ToT) to 200 staff in 4 selected districts covering two development regions of Nepal.

Technical capacity of the district level staff from various departments (DADO, DLSO, DOI etc.,) is crucial for successful implementation of the project. To ensure sustainability of the project outcomes, the capacity development activities on climate change adaptation need to be systematically designed by applying Training of Trainers (ToT) approach. Capacity building efforts will also target the Ilaka (sub-districts) field offices and Village Development Committees (VDC), and other community-based organizations. The training programmes at the district level will focus on community mobilization, vulnerability and risk assessment based on observations and local perceptions, technical details of specific adaptation practices, implementation methodology at the community level, screening adaptation practices based on multi-criteria approach and monitoring for adaptation and socio-economic benefits. The training would provide in depth knowledge about the typology of adaptation practices and its advantage and incremental benefit over business as usual techniques. However, the activity will build on the specific training needs assessment.

A standard curriculum will be developed considering mid-hills and Terai ecosystems and its relevant agricultural livelihoods. The training will also form the basis for facilitation of local level activities especially Farmer Field Schools (FFS). The main activity of this output will be conducting two one-week training programmes in each district (4 x 1 x 2 weeks = 8 weeks). It is expected that the first training will be organized during the first year and second training during the third year of the project.

Training manuals on climate risk and vulnerability assessment, climate change adaptation good practices in agriculture sector will be developed based on training needs assessment. The training manuals will be validated through the above training programmes, and integrated into regular training programmes of MOAD, DOA,DLS and NARC to ensure sustainability. The information

necessary for preparation of training resources will be drawn from the documents such as National Communications, NAPA, research reports from NARC, and project reports of FAO and other development partners. Climate data collected from DHM as part of FAO project was already analysed and handed over to the Ministry of Agricultural Development (MOAD), and the data and results of the analysis will be used for preparation of training manuals. The training curriculum and necessary resources will be integrated into ongoing and regular training programme of MOAD, DOA, DLS and NARC to ensure sustainability. The main activities of this output are: (1) Review of completed and on-going training programmes at the national and district levels and preparation of training needs assessment and agree on list of trainees, (2) Preparation of draft training manual based on the needs assessment and review before the training programme, (3) Consultations to integrate training curriculum into the MOAD's (DOA, DLS, NARC) regular training programmes.

Outcome 1.2: Climate change adaptation mainstreamed into national agriculture and livestock policies, plans and programmes

Output 1.2.1: Technical capacity and cross-sectoral coordination mechanism strengthened within MOAD to facilitate integration of climate change adaptation into agricultural plans and programmes.

The project will develop capacity of implementing partners to better integrate key adaptation requirements for the agriculture sector into cross-sectoral planning and budget processes. At least 25 relevant staff will be trained on mainstreaming climate change adaptation priorities (as indetified in NAPA) of food and agriculture in to Government's agriculture plans, programmes etc. Capacity building support will be linked to the assistance provided by the GEF Global Support Programme -NAPs. The trained experts within MOAD and its agencies will be better prepared to articulate sectoral perspectives into the climate change related planning processes. Simultaneously, these experts would support integration of concerns related to climate variability and change into national agricultural and food security policies, programmes and plans. The training will be organized in two phases – first year and third year of the project. This activity will be linked to the consultation workshops to be conducted under the output 1.2.3 aiming to update the national agricultural policies, strategies and plans to be able to integrate climate change concerns.

Cross-sectoral Coordination Mechanisms need to be strengthened to facilitate the integration of climate change adaptation into agriculture plans and programmes by Ministry of Agricultural Development (MOAD), Department of Agriculture (DOA), Department of Livestock Services (DLS) and Nepal Agriculture Research Council At present, there is no cross-sectoral coordination mechanism within MOAD to share agriculture perspectives into the broader climate change adaptation priorities at the national level. The LDCF resources will be used to strengthen the Environment Unit (that looks after Climate Change) in Food Security and Environment Division, which is renamed from Gender Equity and Environment Division (Climate Change) of the Ministry of Agricultural Development (MOAD). The support will improve work place with minimum furniture as well as technical capacity to enable the supervision of climate change adaptation activities within the Ministry.

The support will also seek to establish a mechanism for information exchange, collaboration, coordination between Ministry of Agricultural Development (MOAD), Ministry of Science, Technology and Environment (MOSTE) and Ministry of Finance (GEF focal ministry) with regard to climate change. In addition, coordination of local actions and constant monitoring is crucial. To cater to the needs of vulnerable districts, there is need to establish a team of regular staff responsible for supervising, coordinating and facilitating the planning and implementation of prioritized activities. Periodic monitoring of activities should be carried out by existing human resources according to the regular procedures of MOAD.

Output 1.2.2: Updated national agriculture strategies and district adaptation/risk reduction plans available with climate change adaptation priorities of NAPA, investment plans and budget (at least

5 strategies/ plans with budget allocation for adaptation actions prepared and endorsed by the Government).

Increased commitment to adaptation at the national level will offer opportunities for building resilience in the agriculture sector. Climate variability and climate change concerns have not yet been fully integrated into Nepal's agriculture policy and planning processes. Despite activities implemented by the government and NGOs, dedicated and predictable budget allocations for adaptation to climate variability and change in the agriculture sector are lacking. FAO's technical assistance has promoted opportunities for aligning agriculture sector plans with the NAPA, including by facilitating national consultations and providing technical support for preparation of the ten-year PFA.

The government is committed to implement the PFA, but continuing efforts are needed for systematically addressing all the priorities through government funding and donor support. The LDCF resources will be used to support consultations and workshops at different levels to integrate climate change concerns into agricultural policies and plans and agriculture perspectives into climate change policies and plans. A detailed review of current situation building on already conducted work by FAO will be done and a detailed work plan will be prepared to systematically contribute to update and preparation of plans as per the Governments requirement during the course of project implementation. The task will be achieved by a policy and mainstreaming expert by facilitating series of consultations with MOAD and other implementing partners.

Component 2: Assessment, monitoring and providing advance early warning information on vulnerabilities, risks of climate change and agrometeorological forecasts to assist better adaptation planning

Outcome 2.1 Improved vulnerability and risk assessment tools, FAOs crop situation and yield assessment methods introduced and implemented at the local level

Output 2.1.1: Improved tools and methods for assessment of climate change risks and vulnerability and crop yield assessment models introduced at the national level and core staff trained (>25 staff at MOAD, DOA, DLS and NARC trained) and linked with at least 4 districts.

NARC is carrying out the climate change impact assessment at the national level using climate change scenarios and crop models. However, the work is constrained by non-availability of sufficient data and tools in addition to lack of technical skill and facilities. The LDCF project will support NARC to establish the required facility and train junior level scientists working in NARC's Agricultural Environment Unit. The work will focus on assessment of impacts of climate variability and change using eco-physiological models. The work will build on the ongoing initiatives by NARC and in close coordination with other similar works in the country. The climate change impact assessment work proposed in this project will complement and build on the work of the projects such as Economic impact assessment of climate change in key sectors in Nepal undertaken by various agencies and will target priorities highlighted in the climate change policy (2011).

MOAD's Agri-business Promotion and Statistics Division is responsible for all current agricultural statistics activities. MOAD's Food and Nutrition Security Section in Food Security and Environment Division compiles information on the impacts of natural disasters (floods, droughts, hailstones, cold waves, etc.) in formats prepared by the Food Security Thematic Group. These formats give priority to collecting victims' profiles for disaster response purposes, to ensure effective rehabilitation and reconstruction activities. Weekly reports are synthesized and published by MOAD in a bi-monthly crop outlook bulletin.

These formats could be made more useful if the weekly data and information were compiled into standard monthly reports in the districts concerned, providing an excellent opportunity for collating

agricultural damage and loss data. The currently available data at the country level does not usually report losses related to agriculture. It should therefore be mandatory for the monthly reports following the harvest of a crop to include assessment of production losses due to extreme climate events. The compilation of district-level data and reports could be streamlined by applying a standard format for monthly reporting, synthesizing weekly reports.

Further, the Agri-business Promotion and Statistics Division is keen to enhance its capacity to monitor crop conditions and provide crop yield forecasting on a near real time basis based on modelling tools and methodologies. Considering the staffing position, simple crop monitoring and yield forecasting technology will be supported from this project. The support includes delivery of hands on training to selected staff of the unit on crop cutting, water balance models and use of remote sensing products. Additional support includes mobilization of a short term consultant (modelling and remote sensing) for compilation of data and working with the staff of the ABPSD to help them prepare crop monitoring and yield forecasting bulletins.

Output 2.1.2: Improved risk and vulnerability assessment methods (from output 2.1.1) used to develop spatial risk and impact information on agriculture for 24 Village Development Committees (VDCs) in 4 districts

Hazard, vulnerability and risk assessments are the cornerstone of preparedness planning and the planning and implementation of risk reduction measures. A comprehensive national- and district-level database on hazards, vulnerabilities and capacities would be an ideal starting point for assessing current risks. In Nepal, such a database is available for some cases, but it is not sufficiently well organized for use in risk management. Vulnerability and risk assessment depends on the amount and quality of the data available and the level of sophistication desired.

The LDCF resources will be used to improve databases, tools and methods for vulnerability and risk assessment and to define the hotspots of vulnerability and risks in agriculture sector. The project will improve the capacities of governmental staff at the national level by training them on assessment tools and methods. The main activities of the output includes: elaboration of currently used methods for risk and vulnerability assessment in Nepal and adoption of suitable tools and methods and preparation of vulnerability and risk maps for the 24 selected VDCs. The vulnerability and risk maps will guide preparation of Local Adaptation Plan of Action (LAPA) in Nepal.

Outcome 2.2: Improved agrometeorological forecast disseminated in 4 districts in close coordination with similar initiatives at the national level

Output 2.2.1: Improved agrometeorological forecast products from the Department of Hydrology and Metheorology (DHM) planned under the Climate Investment Fund's PPCR project will be disseminated to 120 farmer groups (at least 3000 men and women farmers) and wider rural communities in 24 VDCs of 4 districts. The end-users will be trained using Farmer Field School (FFS) approach (new products introduced at the local level and sustainable mechanisms to interpret the forecasts established in 4 districts).

At present, the Department of Hydrology and Meteorology is providing 24 hours forecast to 17 stations in the country; and it is expected that the PPCR project would aim to improve the lead time, timeliness and accuracy of the forecasts. This LDCF project will make use of the existing forecasts and also the new information products planned to be developed under the PPCR project for application at local level focusing specifically on agriculture sector. The LDCF resources will also contribute to strengthening agro-climate monitoring infrastructure in selected 4 districts in close coordination with Climate Investment Fund's PPCR and strengthen the expertise of district agriculture and livestock extension officers to interpret and use the climate data and information for decision making.

This LDCF project will strengthen the technical capacity of the Government agricultural and livestock services at district level (4 districts) to interpret weather and climate information and agro-meteorological information to be developed under the Component D: Agriculture Management Information System (AMIS) of the Climate Investment Fund's PPCR project. This additional activity of the LDCF is relevant even with dissemination of currently available weather information (24 hrs) as this is not being applied for securing agricultural livelihoods at the local level.

The development of new weather and climate information products will be based on the needs assessment with the farmers in all 24 VDCs selected for the project implementation. The needs assessment will be conducted with the 120 farmer groups to be established in all the VDCs. Similarly, the value added weather and climate information will be communicated to the farmer groups through the 120 FFS. In addition, the information products will also be delivered by the national focal units at the Department of Agriculture (DOA) and Department of Livestock Services (DLS) to the concerned district level offices for wider dissemination. The value added products with impact outlooks and management alternatives to reduce the impacts of climate risks will be specific to the locations based on the type of agricultural activity and needs of the farmers.

The weather and climate information will be disseminated at the village level through the Farmer Field Schools (FFS). The FAO project concluded in December 2011 on climate change adaptation (CCA) and disaster risk management (DRM) for sustainable livelihoods in agriculture sector" supported up-gradation of 4 selected agro-meteorological observatories on pilot scale, but requires additional instruments. This LDCF project will focus on further up-gradation of 4 agro-meteorological observatories one each in Siraha, Udayapur, Kapilbastu, Argakhanchi.

The proposed improvement will consist of constructing stone walls with gates around the perimeters of sites, fixing 50-mm angle poles, setting up of nets, installing cup counter anemometers, re-setting Stevenson's screens and rain gauges, and painting the walls and screens. New instruments were installed where required, including thermometers, rain gauges with measuring scales, open pan evaporimeters and cup counter anemometers. This activity will be coordinated with the component B (Modernization of the Observation Networks and Forecasting) of the PPCR project. The activity related to communication of weather and climate information through mobile phone SMS messages as part of the component 2 will be linked with investment related interventions envisioned under component 4.

Component 3: Improving awareness, knowledge and communication on climate impacts and adaptation

Outcome 3.1 Awareness raising, knowledge management and communication strategy drawn, agreed and implementation plan prepared.

Output 3.1.1: Comprehensive and multi-stakeholder awareness raising, knowledge management and communication strategy formulated and agreed with the Government and non-governmental organizations at national, distrct and local levels and applied to fostering implementation of new and currently available adaptation practices outlined in Nepal's NAPA.

The main objective of this output is to build a culture of innovation, and resilience, and to institutionalize awareness-raising on climate change adaptation. The project will facilitate the formulation of awareness-raising, knowledge management and communication strategy for the MOAD. The strategy is expected to provide general guidelines to the MOAD, DOA and DLS at all levels and ensure better connection of local beneficiaries. The strategy will be tested during the project implementation from year 3. Development of strategy document consists of series of consultations (national, district and local) and workshops. Existing knowledge management mechanisms will be reviewed and guidance will be provided for improved procedures and to organize workshops and consultation meetings. A knowledge management and communication

expert will facilitate consultation processes and liaise with the stakeholders to prepare the draft strategy paper for consideration by the government.

Outcome 3.2 Knowledge and awareness on climate change increased and improved adaptation practices and livelihood strategies disseminated for location specific context

Output 3.2.1: At least 120 Farmer Field School (FFS) facilitators in 4 districts trained on climate change impacts and adaptation in agriculture as outlined in NAPA.

During the project period of four years, 120 Farmers Field Schools (FFS) will be implemented in 24 VDCs in 4 districts for learning by doing with the farmers group to adapt to the climate change in crops and livestock. The FFS will be a learning site where farmers and facilitators observe, discuss, experience and document new knowledge for better management in location specific resource endowment and other situations to adapt to the climate change. The farmers will learn and get empowered with knowledge and skills on adaptation to climate change in agriculture.

The implementation of FFS in 120 farmers groups will be done in two phases. In the first year 24 FFS facilitators selected from earlier FFS facilitators will be trained with a refreshers training. Each farmers group will get one trained FFS facilitator for initiating the FFS. Thus in the first season only 24 FFS will be started, one from each VDC. After a season, 4 better performing farmers will be identified from each of the 24 FFS and 15 days long training will be provided to them to facilitate the FFS. Then each of these 96 newly trained facilitators will be assigned to a FFS in the VDC.

Output 3.2.2: At least 120 farmer groups involving a total of over 3000 farmers aware of climate change impacts, adaptation measures and alternative livelihood strategies by implementing Farmer Field School (FFS) by trained facilitators in 4 districts of Nepal.

In total 120 farmer groups will be mobilized. Each farmer group will comprise of 20 to 25 farmers who have more or less similar crop and animal enterprises will be selected for implementation of the FFS. Suitable existing groups, if available will also be used for this purpose. If existing groups are of size larger than 25 members, the group will be asked to nominate 25 farmers among them for the FFS. If not, new groups will be formed with a common interest. The theory behind the FFS is that the farmers are experts in conducting their own field studies, but not all the farmers are equally expert. Sharing their experiences benefits each other. In total 120 farmer groups involving at least 3000 farmers will be closely engaged in FFS. Most of the teaching materials will come from farms, such as crops growing, animals raised, weather changing, water, soil moisture, disease and pests, soil quality, effects of climate change, benefits from adaptation. All the observations and operations are made in the farm. The farmers groups collect data from their farm and analyse them and make their own decisions and share their decisions to other farmers. Their decisions will be supported by weather forecasts products and farm advisory provided. By learning by doing exercise, over 3000 farmers in four districts are expected to better understand climate change impacts, adaptation measures and alternative livelihood strategies.

Output 3.2.3: Project-related good-practices (at least 25) elaborated and lessons-learned disseminated via publications, project website and others to facilitate up-scaling and integration into policies and plans by the Government and replication in similar situations by non-government organizations

The good practice examples will be screened based on the indicators: environment friendliness, potential to reduce the impacts of climate risks, economic viability, sustainability, social acceptability, gender sensitivity, income generation, enterprise diversification, seasonal relevance and community's need. This includes packaging of at least 25 successfully tested and replicable adaptation practices. This includes packaging of information on at least 5-6 new varieties of fruit trees or multi-purpose tree species suitable for reducing the climate related risks under changing

conditions. Field implementation of livelihood alternatives, climate resilient physical measures to improve livelihood assets and sources of income, transfer of adaptation technology relevant to agriculture and new stress tolerant varieties are expected to produce at least 25 innovative case studies to be integrated into national sectoral strategies (linked to component 1 and 3 of this project) and plans for up-scaling to similar areas in the country.

Component 4: Prioritizing and implementing local investment by promoting Community Based Adaptation (CBA) to strengthen livelihood strategies and transfer of adaptation technology in targeted areas.

Outcome 4.1 Livelihood alternatives and climate-resilient physical measures prioritized and implemented by promoting Community Based Adaptation (CBA) to climate change.

Output 4.1.1: Investment to strengthen livelihood alternatives and small-scale climate- resilient physical measures prioritized through Local Adaptation Plans of Action (LAPAs) by involving the community and farmer groups (at least 24 LAPAs prepared and endorsed).

The LDCF project will mobilize the local communities at village development committees (VDCs) to formulate **Local Adaptation Plans of Action (LAPA)** with an aim to prioritize local small-scale investments for strengthening livelihood assets, sources of income and for transfer of relevant adaptation technology for reducing climate risks. Prioritization of local/small scale investments and adaptation activities and subsequent implementation will be achieved by following Community Based Adaptation (CBA) and participatory tools and methods such as transect, risk and vulnerability mapping, hazard calendar, cropping calendar, matrix ranking, venn diagram and problem tree.

The LDCF funding for these activities will be highly appropriate and provide alternate livelihoods and income sources to vulnerable communities. The approach will be highly cost-effective and efficient as adaptation investments will be streamlined through the existing community networks, and will mobilize existing functional farmers' groups/CBOs (Community-based Organizations). Community mobilization and facilitation work will ensure prioritization of sustainable, climate-resilient adaptation practices against climate change impacts in crop-agriculture and livestock sub-sectors to prepare and implement LAPAs in at least 24 VDCs covering 4 districts.

Output 4.1.2: Diversified livelihood strategies and alternate sources of income (eg. Off-season vegetable cultivation, multi-purpose tree species, tree-crop alley farming, livestock enterprises etc.,) implemented in 24 Village Development Committees (VDCs) of 4 selected districts.

The community-driven, bottom-up approaches clearly demonstrate that concrete actions for addressing underlying vulnerabilities are a priority in preparing for future risks and enhancing adaptation. Good practices for adaptation include promotion of agricultural service systems to facilitate community-based seed storage and maintenance, crop diversification, and integrated approaches to hazard risk reduction. conservation of biodiversity and traditional crops; promotion of conservation agriculture in rice–wheat systems, improved crops and cropping systems, multi-storey cropping and agroforestry systems; sustainable use of forest resources through community forest user groups; and alternative energy sources for households.

Short-term risk management practices in the livestock sector include vaccination against contagious animal diseases, deworming against internal parasites, and the use of animal relief camps during disasters. Livestock performance can be improved by introducing new grass and legume species, planting multipurpose tree species, improving support services in livestock areas, cultivating fodder grasses and legumes (summer and winter perennials), and improving animal sheds. Opportunities to facilitate adaptation and mitigation synergies in the livestock sector include improving manure management and promoting the production and use of biogas at the community level.

Output 4.1.3: Small-scale physical measures implemented to conserve and protect livelihood assets at the community level (eg. water conservation and harvesting, management of degraded community resources, bio-engineering for erosion control etc.,) in 24 VDCs of 4 districts

Resource conservation is pivotal to promote adaptation and resilience in agriculture. Resource conservation practices involve small-scale physical measures implemented to protect livelihood assets at the community level. This includes rainwater harvesting and soil moisture conservation; improvement of degraded land; protection from riverbank cutting and inundation; slope stabilization and management.

The investments prioritized for implementation under this output, particularly agriculture based livelihood enhancement, is having similar objectives as the AFSP which is also be supporting local communities, farmer groups, producer groups in initiating activities (on and off-farm) that are aimed to enhance the livelihood assets at the local level. The AFSP project will be implemented in 19 districts of Mid- and Far-Western regions, among which non is selected for this LDCF project and thus potential overlaps will be avoided.

Outcome 4.2 Adaptation technology relevant to agriculture implemented and new stress tolerant varieties introduced to reduce climate risks

Output 4.2.1: Improved agriculture and livestock management technologies (eg. Improved cropping systems, improved seed storage, sloping land agriculture technology, crop and livestock management practices etc.) implemented to reduce climate risks in at least 24 VDCs of 4 selected districts

The practices identified at the local level and through the involvement of agricultural research and extension systems are not completely new, but capacity building is needed to ensure that climate issues are considered in the planning and implementation of these practices. The participation of agricultural support institutions and farming communities is essential in facilitating policy advocacy, especially for the implementation of a national priority framework of action for climate change adaptation and disaster risk management, and of local risk reduction plans. Field-level actions contribute significantly to mainstreaming the priority agriculture sector interventions in programmes and plans, especially the National Adaptation Programme of Action and the Priority Framework for Action of the Ministry of Agricultural Development. Cross-cutting elements – capacity building, gender considerations and policy advocacy – are central to successful planning for managing climate risks and advancing adaptation in the agriculture sector.

The LAPA's investment priorities will incorporate climate risk management and adaptation practices in farming (soil and water conservation practices, water harvesting techniques, management of degraded land and community resources, sloping agricultural land technologies (SALT), off-season vegetable production, alternative livelihood options, risk-related seed storage and processing), agro-forestry (bioengineering for river bank protection, multi-purpose tree species, tree-crop alley farming systems) and livestock (improved livestock management, drought tolerant fodder species, vaccination, etc.,) sectors.

Output 4.2.2: New stress tolerant crop varieties of rice, wheat, maize and fodder (at least 10 varieties) recommended by Nepal Agriculture Research Council (NARC) introduced in 4 districts and tested and validated involving farmer groups using FFS approach.

The project will prioritize over 120 field demonstrations of new crop and fodder varieties in 5 agriculture seasons. Promoting adoption of drought and high temperature tolerant crop varieties, management of high- and low-temperature stress will be the major focus of this output. The activities under this output will be carried out by NARC in close collaboration with DADO, DLSO and other implementing partners. The field demonstrations will be closely linked to the Farmer

Field Schools (FFS) to be conducted as part of the output 3.2.2. The list of stress tolerant varieties is provided in the annex.

2.5 ADAPTATION BENEFITS

Enhanced technical and institutional capacity, improved coordination between Ministry of Agricultural Development (MOAD) and other ministries on climate change matters, and readiness to respond to climate change impacts and mainstreaming of adaptation priorities into national agricultural policies, plans and programmes are the expected adaptation benefits from the LDCF resources. The indicators to quantify the results of the Component 1 are number of staff trained in prioritization and implementation of adaptation priorities (50), mainstreaming adaptation into sectoral policies and plans (25), number of Training of Trainers (TOT) with improved technical expertise at the district level (200), training manuals (3) and curriculum integrated into the Government's regular activities, number of updated national agricultural strategies integrating adaptation priorities (at least 3) and district level climate risk reduction plans (4) with budget allocation prepared and endorsed by the Government. The exact indicators with gender disaggregation are defined and incorporated into relevant sections and Adaptation Monitoring and Assessment Tool (AMAT).

The expected adaptation benefits of Component 2 financed by the LDCF resources will be: i) new climate and crop databases specific to the 4 districts; ii) introduction of new tools and methods of risk and vulnerability assessment at the national level; iii) improved methods of crop monitoring based on FAO methodology; and iv) dissemination of forecast products developed at the Department of Hydrology and Meteorology (DHM) through PPCR project to farmers in 4 districts and at least 40 village development committees (VDCs) through already established Farmer Field Schools (FFS). This will contribute to increase the adaptive capacity of government institutions and local farmer groups.

The indicators for these adaptation benefits will be: i) availability of updated risk and vulnerability assessments in 4 districts; ii) number of upgraded agro-meteorological monitoring systems (at least 4); iii) a new system in place at the Department of Agriculture (DOA) and Department of Livestock Services (DLS), to interpret and disseminate timely risk information; iv) at least 3 new agro-meteorological information products are available and (v) at least 4 districts and 24 VDCs and 120 farmers groups are receiving climate information products for pro-active decision making. These new developments will be integrated into the Government plans and programmes with budget provision for sustained operation and maintenance beyond the duration of the project.

This include development of a comprehensive multi-stakeholder awareness raising and communication strategy, conduct of 120 farmer field schools in 4 districts, creating awareness to 120 farmer groups (3000 farmers, including women groups) on climate change adaptation, documentation and dissemination of good practices to facilitate up-scaling and hosting materials through the existing website of the Ministry of Agricultural Development (MOAD) on climate change and conduct of field days and farmer exchange visits for mutual learning in four districts.

The indicators of adaptation benefits of this component are: i) number of LAPAs with investment priorities prepared and endorsed (~24), (ii) type and number of climate resilient income sources for households implemented; ii) type and number of adaptation technologies transferred to targeted groups through field demonstrations (120 in four districts in 4 years); and (iii) number of measures for climate-resilient natural resources management (at least 5) demonstrated to withstand and prevent economic losses. In addition, this component will facilitate research and development linkage by engaging research institutes (e.g. NARC) in demonstration of high temperature and drought tolerant varieties of rice, wheat, maize and fodder (10 varieties) at farmers' field level. Detailed gender disaggregation will be done for AMAT indicators during the project implementation.

2.6 COST EFFECTIVENESS (ALTERNATIVE STRATEGIES AND METHODOLOGIES CONSIDERED)

The 'additional costs' associated with loss of development benefits due to climate change and increased climate variability need to have close synergies and complementarity with the baseline project interventions. This means the activities of the partners in the baseline cover most of the basic development issues but some of the key considerations to climate change and increasing climate variability have not been considered. With a baseline and co-financing of over US$12.99 million, the FAO/GEF costs are less than 20% of the entire Project.

The proposed Project follows on from previous collaboration between FAO and Nepal on adaptation and livelihood alternatives. The proposed Project will build on the lessons and implementation approach of the previous phases of the support to ensure cost-effectiveness. The present Project builds on the specific implementation arrangements developed during the previous FAO support between 2008 and 2011. This includes development of technical capacity in the MOAD at national and district levels.

Several alternative approaches were considered for cost-effectiveness. These alternatives included combination of institutional and technical capacity development. The alternative approach of participatory decision making promotes learning-by-doing approach compared to conventional extension approaches. The Project aims to minimize the mobilization of international experts. This will reduce the costs associated with travel and consultancy. International experts will be hired on specific topics for which local experts are not available. At the local level, the Project will rely extensively on farmer-farmer experience sharing though Farmer Field Schools.

2.7 INNOVATIVENESS

The project has innovative elements especially by leveraging the benefits of the research – development linkages to ensure transfer of innovative adaptation practices to the local communities, linking the farmers with entrepreneurs and subsequently to the market. The local crop landraces having adaptation and income generating potential will be promoted and these activities are closely linked to mandates of research institutions for further improvement and up-scaling.

Institutions play a key role in introducing new agricultural technologies to farmers. Changes in resource endowments resulting from climate change can become a trigger for institutional innovation. Institutions may reinforce agricultural adaptation by introducing location-specific technologies in anticipation of future needs, linking local, national and international institutions to transfer technologies, integrating local institutions into markets to enhance economic returns, and helping farmers to organize and manage local resources through collective action.

Farmers and their support institutions are the key players in technological innovations and have been an integral part of agricultural development. The capacity to respond to changing climate depends on knowledge flow through a broad range of institutions, including farmer-to-farmer interactions. In this context, several institutions in Nepal provide support services and enhance local-level knowledge exchange. These institutions each have their areas of focus, and together they provide farmers with access to services that facilitate improved agricultural practices.

Innovative technologies at the local level are crucial for enhancing the adaptive capacity of farmers. Innovations should be introduced with the full participation of farmers and the community at large, as interactions among institutions and farmers facilitate knowledge exchange and awareness rising. Nepal's evolving experience in dealing with dwindling food security has shown that there is a demand for the broad participation of farmers and their supporting institutions in technological innovation. The development of multi-level institutional partnerships, including collaboration with farmers and NGOs at critical stages of technological innovation, is crucial to advancing climate risk management, adaptation and resilience building.

SECTION 3 – FEASIBILITY

The project is anchored into a number of policies and programmes of the Government of Nepal. This provides opportunities to scale-up the project initiatives by the Government and other partners. Support to bottom up community participatory approaches are incorporated into the project document especially at the local level. Applying participatory approaches for decision making and implementation, and capacity development, will enable the poor and most vulnerable to engage in and benefit from local investments and take ownership of the interventions. There are opportunities to engage civil society and private sector and thus continuous support at local level is ensured and this will sustain the efforts. The efforts at the local level will be complemented by capacity development activities with the Government institutions at the national, regional and district levels to provide continuous support services to promote local actions aimed at reducing vulnerability and interventions on sustainable land and water management.

3.1 ENVIRONMENTAL IMPACT ASSESSMENT

Project Title: Reducing vulnerability and increasing adaptive capacity to respond to impacts of climate change and variability for sustainable livelihoods in agriculture sector in Nepal.

Project description: The LDCF project aims to support the Nepal agriculture sector to become climate resilient by promoting urgent and immediate adaptation measures and integration of adaptation priorities outlined in the NAPA into agriculture sectorial policies, plans, programmes and local actions. The overall objective of the project is "to strengthen institutional and technical capacities for reducing vulnerability and promoting climate-resilient practices, strategies and plans for effectively responding to the impacts of climate change and variability in agriculture sector."

The project consists of four components and is aligned with the LCDF outcomes. The component 1 supports activities for strengthening of technical and institutional capacities and integration of adaptation priorities into national food and agriculture policies, strategies and plans. The component 2 contributes to assessment, monitoring and providing advance early warning information on vulnerabilities risks and agro-meteorological forecasts. The component 3 supports to improving awareness, knowledge and communication on climate impacts and adaptation and strengthening of systems to disseminate timely risk information. The component 4 supports activities aiming to promote community based adaptation and strengthening livelihood strategies. The likely impacts of project activities component wise on the environment is discussed below.

Component 1: Strengthening of technical and institutional capacities and integrating adaptation into national food and agriculture policies, strategies and plans

The activities proposed under this component will not attract EIA or IEE under Nepal law. Staff training provided for strengthening technical and institutional capacities in the MOAD, DOA, DLS, NARC and local stakeholders on climate change adaptation will not have any negative environmental impact. Improvement of technical expertise of district and local level DOA and DLS staff on climate change adaptation through ToT will support to enhance environmental management. Likewise, development of training manuals on climate risk and vulnerability assessment, climate change adaptation good practices, and mainstreaming climate change adaptation in agriculture sector will help to choose appropriate adaptation measures and hence will have positive impact on environment. Similarly, strengthening of cross-sectoral coordination mechanism and development of adaptation and risk reduction plans will engage several institutions working on environment management. There will be broader cooperation and collaboration among the institutions and agencies and that is expected to have positive environmental impacts.

Component 2: Assessment, monitoring and providing advance early warning information on vulnerabilities,risks of climate change and agrometeorological forecasts to assist better adaptation planning

This component includes introduction of improved tools and methods for assessment of climate change risks and vulnerability and crop yield assessment models and training of core staff. It also includes improved risk and vulnerability assessment methods for spatial risk and impact information on agriculture. Similarly, the project under this component will disseminate improved agro-meteorological forecast products to 120 farmer groups and wider rural communities in 24 VDCs of 4 districts. The end-users will be trained using Farmer Field School (FFS) approach. Improved agro-meteorological information can help to make proactive decisions that will help better environmental management and thus none of the proposed activities can have adverse environmental impact.

Component 3: Improving awareness, knowledge and communication on climate impacts and adaptation

This component involves activities like formulation of awareness raising, knowledge management and communication strategy, training of 120 FFS facilitators on climate change impacts and adaptation in agriculture and implementation of 120 FFS through farmer groups involving a total of over 3000 farmers to aware them on climate change impacts, adaptation measures and alternative livelihood strategies. Similarly, the project will disseminate at least 25 good-practices and lessons-learned via publications, project website and others to facilitate up-scaling and integration into policies and plans. This will help in replication in similar situations. The activities can contribute positively to the projects directly addressing broader environmental issues in selected districts.

Component 4: Prioritizing and implementing local investment by promoting Community Based Adaptation (CBA) to strengthen livelihood strategies and transfer of adaptation technology in targeted areas

This component covers livelihood alternatives, climate-resilient physical measures and adaptation technology. LAPA development will prioritise investment to strengthen livelihood alternatives and small-scale climate- resilient physical measures. Diversification of livelihood strategies and alternate sources of income will include off-season vegetable cultivation, multi-purpose tree species, tree-crop alley farming, livestock enterprises etc. Off season vegetable may need some amount of pesticides. The FFS approach minimises the use of chemical pesticides. The livestock enterprises will be in small scale with smallholder farmers in the villages. Thus, none of them will be of large scale enough to attract any EIA or IEE. Similarly, the small-scale physical measures that will be implemented to conserve and protect livelihood assets at the community level includes small-scale water conservation ponds and slope land protection, and management of degraded community resources, bio-engineering for erosion control etc. None of these activities will damage the environment.

Implementation of adaptation technology relevant to agriculture and introduction of new stress tolerant varieties to reduce climate risks will not have negative environmental impacts. The improved agriculture and livestock management technologies include improved cropping systems, improved seed storage, sloping land agriculture technology, crop and livestock management practices can reduce climate risks without having adverse environmental impacts. Introduction of new stress tolerant crop varieties of rice, wheat, maize and fodder will not have adverse effects to agro-biodiversity, because only the varieties recommended by Nepal Agriculture Research Council (NARC) will be demonstrated. The local checks and traditional varieties will be included in the demonstrations and farmers could compare the improved varieties with their traditional varieties.

CERTIFICATE

Project Category C	Yes	No

I affirm that I have performed an environmental review of this project and certify that the project conforms to the pre-approved list of projects excluded from environmental assessment and that the project will have minimal or no adverse environmental or social impacts. No further analysis is required.	X	

Certification

Title, name and signature of project leader: _____

3.2 RISK MANAGEMENT

Within the context of baseline situation and project components, a number of risks are identified during the PIF preparation stage. Additional risks are identified during the full project preparation stage and are elaborated. The risks, their impacts, probability and mitigation are presented in the Table below:

Table 4. Risks, impacts, levels of risk and risk mitigation measures

	Risk	**Impact**	**Level of Risk**	**Mitigation Measures**
1.	Civil unrest in the pilot districts, particularly in the *Terai* region	Delay or blocking of project operations at village level	L	Broader stakeholder consultations conducted to agree on the selection of village development committees. Local field monitors will be employed to oversee and assist the District Agriculture Development Office (DADO) and facilitate field work at the local level. The risk is low now compared to the past and FAO has the experience to manage this risk by employing local staff. The risk could be substantially reduced by strengthening the inter-ministerial steering committee and also multi-sectoral task team at the district level. FAO has facilitated creation of the above institutional mechanisms in the four selected districts of this LDCF project.
2.	Low level of participation of the most vulnerable communities and farmer groups in the project	Limitations in quality of project delivery and lack of ownership	M	A guided learning-by-doing strategy is built into the project to strengthen community mobilization and participation.
3.	Delay in procurement and delivery of inputs for demonstration of improved adaptation practices.	Delayed project implementation & loss of trust in project among farmers	L	An effective mechanism for procurement of inputs is agreed upon and will follow FAO's standard procedures relevant to identification of sources of inputs and efficient planning with suppliers.
4.	Area is again affected by climate extremes during project implementation	Immediate recovery needs do not allow to focus on longer term adaptation measures	L/M	Project activities are planned taking into consideration anticipated needs of the rainy season; crop calendars inform the planning and implementation of adaptation measures
5.	Risk of policy recommendations not adopted by policy makers	Limited improvements achieved in the institutional framework for adaptation and mainstreaming	L	Engaging stakeholders including policy makers in update of policies and strategies. Providing the project steering committee with suitable information about the importance of policy integration.
6.	Non-synchronization of co-financing projects with this LDCF project	LDCF project tends to support business-as-usual interventions	L	In-depth analysis of co-financing projects and its baseline interventions was done during the project preparation. Strong commitment was ensured from development partners and government agencies.

	Risk	Impact	Level of Risk	Mitigation Measures
7	Risk of low quality of input supply (seed, breed, chemicals)	Expected production level is difficult to be achieved	L	All the farm inputs including seeds, breeds, and chemicals will be procured only after obtaining acceptable quality certification or quality test.
8	Delay in recruitment of project staff	Delay in project implementation	L	Schedule for recruitment of the project staff will be adhered to based on the agreed work plan.
9	Project staff may leave the project in between	Time loss in recruiting a new staff and the newly recruited staff takes time to fully run the project activities	L	Staff selection criteria will be developed to identify staffs that are unlikely to drop in between. The facilities provided to the staff will be commensurate with their qualification and experience. In case somebody drops, immediate steps will be followed to recruit new ones.
10	Transfer of government staff counterparts	Delay in project implementation due to learning time by the new staff	L	The government will be requested not to transfer the counterpart staff in between the project as far as possible. At least two staffs will be involved in project implementation from each counterpart office. The issue was discussed with DOA and DLS during the PPG final workshop.
11	Changes in political structure of local governments (likely to go to federal structure)	Changes in the political structure can change commitment of the local governments and aspirations of the people	M	New political structure will be briefed soon after it comes into power to get their commitment.

SECTION 4 – IMPLEMENTATION AND MANAGEMENT ARRANGEMENTS

4.1 INSTITUTIONAL ARRANGEMENTS

a) General institutional context and responsibilities

The Government of Nepal constituted the **Climate Change Council** chaired by the Prime Minister in 2009. This 25-member council provides guidance on policies and programmes. Its major functions are to: (i) provide coordination, guidance and direction for the formulation and implementation of climate change-related policies, (ii) provide guidance for the integration of climate change issues into long-term policies, perspective plans and programmes, (iii) take measures to include climate change in the national development agenda, (iv) initiate and coordinate activities for generating additional financial and technical support for climate change-related programme, and projects, (v) initiate and coordinate activities for generating additional benefits from international negotiations and decisions related to climate change. This exhibits high level commitment to deal with the problems of climate change.

Understanding the threats and adverse impacts of climate change, the government has constituted the **Multi-sectoral Climate Change Initiatives Coordination Committee** to serve as the national platform for ensuring regular dialogue and consultations on climate change-related policies, plans, financing, programmes/projects and activities. The committee will establish and/or improve communication mechanisms among the institutions concerned with and involved in climate change; coordinate climate change response programmes to foster synergy, avoid duplication of efforts and optimize benefits from existing programmes, and coordinate activities related to policies, plans, strategies, financing programmes and projects; provide inputs for developing consensus on climate-related issues under international climate change negotiations; provide inputs to ensure financing for the effective implementation, monitoring and evaluation of adaptation actions, including those identified in the NAPA process. This effort of the government shows that importance of multi-sectoral coordination is felt necessary to fight the problem of climate change.

The Ministry of Agricultural Development (MOAD) is the main body responsible for implementing the CCA programmes and projects in agriculture. The implementing agencies are the two departments, Department of Agriculture (DOA) and the Department of Livestock Services (DLS), of MOAD. Agricultural development programmes are implemented in all 75 districts of Nepal, with DADO,

DLSO and several agriculture and livestock service centres and thousands of pocket areas operating at the grassroots level. Supervision and technical backstopping at the regional level are carried out by five regional directorates, each with agriculture and livestock departments.

At the district level, the District Disaster Relief Committee (DDRC) is the permanent body for coordinating relief and preparedness activities. Each DDRC is chaired by the Chief District Officer, who is the main administrative functionary for maintaining law and order at the district level. Other DDRC members are representatives of the district-level offices of various public sector agencies, such as those for water supply, education, health, national-level political parties and the Nepal Red Cross Society, the police, housing and urban development, irrigation and forestry, the District Livestock Service Office (DLSO) and the District Agriculture Development Office (DADO). The Local Development Officer – the district-level officer of the Ministry of Federal Affairs and Local Development (MOFALD), who coordinates development works with elected bodies at the district level – is the DDRC Secretary. The roles and responsibilities of the DDRCs are to:

- facilitate, monitor and guide relief and response activities;
- oversee the development, implementation, monitoring and periodic updating of disaster risk reduction strategies, plans and programmes through government and non-governmental entities at the district level;
- formulate and implement response, recovery and rehabilitation plans;
- mobilize resources for response, recovery and rehabilitation after a disaster;
- establish networks and coordinate response activities among international and national NGOs, private sector actors and government stakeholders;
- assess the disaster risks arising from different natural hazards and vulnerabilities, and develop a system for periodically updating these assessments;
- coordinate with the Central Disaster Relief Committee during disasters that affect the district.

The DDRC is familiar with conditions at the district level and is the apex body for coordination and linkages during a disaster. DDRCs have the capacity to mobilize resources for designing and implementing risk management projects, and acts as sharing fora for the mainstreaming of climate risk management into district-level programmes and projects. DDRCs could play a major advisory role in climate change adaptation at the district level, but they will require comprehensive capacity development initiatives to do so.

At community-level, different types of organizations work: community forest user groups (CFUGs), water users' committee, local NGOs, mothers' groups, youth clubs, farmers' groups, CBOs and government organizations such as agriculture and livestock service centers, post office, and health post. However, this broad range of existing institutions suffers from gaps that include the lack of networks among institutions at the local level, inadequate connections to external agencies, ineffective governance, and poor coordination on matters related to climate change. CFUGs play a significant role in protecting the forest through community plantations and protections. They promote controlled grazing to reduce soil erosion and riverbank cutting, and participate in the construction of roads, culverts, drinking-water facilities, community sanitation and small temporary crossings in villages using the income from the forests. CFUGs provide very sustainable grassroots-level institutions that can take the lead on natural resources management and adaptation. Agro-forestry related activities in the local-level adaptation can benefit from the experiences of CFUGs and the forestry coordination committees in VDCs.

Water user associations (WUAs) are responsible for managing river water for surface irrigation; their main task is water management within their respective command areas. WUAs promote increased productivity and crop yields by managing irrigation in farmers' fields and contribute to reducing the impact of floods and water inundation.

Framers' groups are responsible for sharing knowledge and skills with each other and disseminating new technologies among their members. Some farmers' groups gather funds to supply agricultural

inputs and tools such as spare parts and pesticide tanks, and low-interest loans for members. They help to disseminate knowledge and skills in disease and pest management and improved farming, organize training and tours, distribute inputs, and implement awareness raising and riverbank protection work with bioengineering.

Savings and credit groups collect monthly contributions from their members and extend loans to small-scale enterprises at reasonable interest rates. Most loans are used to acquire agricultural inputs for improved farming. Savings and credit groups are effective in building farmers' coping capacities to reduce the impacts of climate risks.

Several other types of institution contribute to climate risk management and increasing the adaptive capacity of local communities:

- *Cooperatives* provide various facilities – marketing of inputs and products from cooperative farming, market regulation of agricultural commodities, and provision of loans to support farmers' on- and off-farm activities.
- *Youth clubs* are involved in social mobilization, community empowerment, advocacy and the enforcement of rights.
- *Mothers' groups* impart knowledge and skills in improved agricultural practices among their members, as well as carrying out regular savings and credit activities.
- *Local NGOs* provide training and implement interventions for reducing the effects of climate-related hazards.
- *Government organizations at the local level* deliver technical training to develop the capacities of farmers' groups.

Regarding adaptation, cooperatives could be instrumental in reducing vulnerability by providing financial support to create off-farm, income-generating activities. In Nepal, about 1.2 million people are involved in cooperatives, which directly employ more than 16 000 people. Women's cooperatives account for 12 percent of the total number of cooperatives. The services offered by cooperatives are instrumental in generating income through the establishment of microenterprises and employment opportunities, but cooperatives need to reach the poorest of the poor, women and other disadvantaged groups.

Women's cooperatives mobilize local resources to create employment opportunities for women. There are many examples of rural women receiving financial support for microenterprises such as goat raising, vegetable cultivation, puffed rice production, snack making, tailoring, tearooms and grocery shops. Cooperatives' capacity could be further strengthened by building strategic alliances with other service providers at the district and national levels. For example, women's cooperatives can establish links to biogas companies, and cooperatives can operate as marketing agents for the supply of local products through links with larger market actors.

Community participation is critical to understanding location-specific risks and suitable responses, and failure to take into account location-specific characteristics can undermine development activities, especially in risk-prone areas. District-level agriculture and livestock offices should engage local institutions in promoting location-specific practices: for example, in marginal/sloping land, goat raising is a better option than buffalo raising; the high-yielding maize variety Rampur Composite is not necessarily suitable in the mid-hills because of infestations of white grub, borer, northern blight and sheath rot; and the pulpy variety of ginger yields less in areas prone to rhizome rot.

Several factors reduce communities' participation in local institutions. In rural Nepal, caste and ethnicity constitute the most important variables around which individuals, households and communities aggregate for group action. Although not associated with efforts to address climate adaptation, caste has a deep-rooted role in determining how individuals react to climate stress, variability and change. This has significant implications for people's capacity to adapt, particularly people in lower castes.

b) Coordination with other ongoing and planned initiatives

The proposed project will work in cooperation with other initiatives taken by the Ministry of Agricultural Development (MOAD), the Ministry of Home Affairs (MOHA), Ministry of Federal Affairs and Local Development (MOFALD), Ministry of Science, Technology and Environment (MOSTE), Ministry of Forestry and Soil Conservation (MOFSC) and Ministry of Irrigation (MOI), to improve synergies and cost-effectiveness, such as:

Project for Agricultural Commercialization and Trade (PACT) (Project ID P087140) June 2009 – June 2018). The project was funded US$ 26.5 million by the World Bank. The original objective was to improve the competitiveness' of smallholder farmers and the agribusiness sector in selected commodity value chains in 25 districts. The project has three components, namely (i) agriculture and rural business development; (ii) support for Sanitary and Phytosanitary facilities and food quality management; and (iii) project management, and monitoring and evaluation. The first component administers competitive grant system to develop agriculture and rural businesses. The project issues calls for proposals from value chain participants and provides matching grants. These sub projects thus funded cover the agriculture commodities of cereal seeds, coffee, floriculture, ginger, potato seeds, rainbow trout, vegetables and others (http://pact.gov.np). Value Chain (VC) studies are conducted for some major commodities. The matching grants are for technology support and agribusiness support while pre-investment and advisory support from other organizations. The beneficiaries are producer organizations that operate for-profit businesses. The component two supports implementation of Sanitary and Phytosanitary facilities and food quality management through three line departments of the MOAD, namely DFTQC, Veterinary Standards and Drug Administration Office under DLS, National Plant Quarantine Program under DOA and also for private sector[10].

The PACT was extended in October 2012 with additional US$ 40 million financing from the World Bank up to June 2018. Out of this amount UD$ 4.00 million is taken as cofinancing for the proposed project. Additional financing of US$ 22 million in credit and US$ 18 million grant for increasing the coverage to all the 75 districts in Nepal. Revised project development objective is to improve the competitiveness of project supported smallholder farmers and agribusinesses within selected commodity value chains. The changes to the extended project are: a) extension of the closing date of the original project; b) revised objectives removing the restriction on project districts and scale up the scope of the project; and c) revised targets of outcome indicators to reflect scaling up of investments. For this added project, co-financing of the Nepal Government is US$ 1.5 million.

Irrigation and Water Resources Management Project (IWRMP) – Phase II: Funded by the World Bank aims to improve irrigated agriculture productivity and management of selected irrigation schemes, and enhance institutional capacity for integrated water resources management. The project is implemented by Department of Irrigation, Department of Agriculture (DOA) and Water and Energy Commission. This project was started in 2007 with a budget of USD 60,000,000 and the first phase was completed in 2013. The project is now extended to June 2018 with additional USD 50,000,000. This project covers: Taplejung, Sankhuwasabha, Terathum, Bhojpur, Okhladhunga, Khotang, Solukhumbu, Ramechhap, Mustang, Gorkha, Myagdi, Manag, Argakkanchi, Kapilbastu, Dailekh, Jajarkot, Salyan, Rolpa, Rukkum, Mugu, Humla, Achham, Darchula, Bajhang, Bajura. Two of the LDCF districts are part of the list, and good practices and lessons learned from this project will be used as part of the LDCF project.

The World Bank project is extended in November 2013 till June 2018 with additional US$ 50 million funding (60% credit and 40% grant). The objectives and the components of the project remain the same[11] as the phase I. The fourth component, namely integrated crop and water management has a

[10] http://documents.worldbank.org/curated/en/2012/10/16902848/nepal-additional-financing-agricultural-commercialization-trade-project

[11] http://documents.worldbank.org/curated/en/2013/11/18611641/nepal-additional-financing-irrigation-water-resources-management-project.

budget of US$ 8.26 million. The World Bank funding of US$ 65 million for December 2007 to June 2013 has been completed in 2013 and the major objectives were: to improve and sustain irrigated agricultural productivity and manage water resources efficiently through effective regulatory measures and harmonized water resources policy and acts. The objectives were achieved through (a) irrigation infrastructure development and improvement including promotion of micro-irrigation facilities for marginal and disadvantaged groups of farmers; (b) completion and consolidation of irrigation management transfer reforms; and (c) institutional and policy support for better water management and productivity.

The project has four components, namely (i) irrigation infrastructure development and improvement; (ii) irrigation management transfer reform; (iii) institutional and policy support for better water management; and (iv) integrated crop and water management. The first two components are implemented by the Department of Irrigation (DOI), the third component by Water and Energy Commission (WECS), and Department of Hydrology and Meteorology (DHM) and the fourth component jointly by DOA and DOI. The last component, which is much helpful for climate change adaptation, integrates the irrigation system rehabilitation and improved irrigation service provided with downstream agricultural activities. This is done through providing a package of modernized agriculture practices and institutional support for both on-farm and off-farm rural population towards achieving optimal level of agricultural production, reduction in rural poverty, enhancement of-farm and off-farm income and food security[12]. Two of the IWRMP districts namely Argakhanchi and Kapilbastu are among the project districts of the proposed GEF project.

High Value Agriculture Project in Hill and Mountain Areas (HVAP) (Jul 2010 – Sep 2017) is funded (USD 18,900,000) by IFAD with the goal of reduction of poverty and vulnerability of women and men in hill and mountain areas of the Mid-Western Development Region. The project targets the rural poor, especially women and marginal groups and ensures to integrate in high value agriculture and value chains in 10 districts (Surkhet, Dailekh, Achham, Kalikot, Jumla, Jajarkot, Salyan, Mugu, Dolpa and Humla) and none of the districts are covered by this LDCF project. However, the good practices identified from the project will be considered for implementation through LDCF.

High Mountain Agribusiness and Livelihood Improvement (HIMALI) Project (2011 – 2017), assisted by the ADB (USD 30,000,000) and seek to reduce poverty in highland areas, by improving income, employment opportunities and the nutritional status of poor farm families and women in particular; and by developing agriculture and NTFP and increasing the productivity of the livestock subsector through value chain development. The project provides grant assistant to farmers, farmers groups, cooperative, and other entrepreneurs to stimulate private sector for agribusiness development. The major component of HIMALI is economic growth environmental sustainability of private sector development. This project covers 10 districts (Jumla, Humla, Mugu, Dolpa, Mustang, Manang, Rasuwa, Dolakha, Solukhumbu, Sankhuwasabha) and there is no overlap with the LDCF districts. Though none of the district overlaps with the proposed project districts, experience of this project will be helpful for developing livelihood alternatives in the proposed project.

~~**Agriculture and Food Security Project (AFSP) (2012 – 2017)** with support from the Global Agriculture and Food Security Fund (USD 58,000,000) and the Government of Nepal is under implementation and covers 19 districts of Mid and Far western Regions (Dailekh , Jajarkot, Surkhet, Dolpa, Humla, Jumla, Kalikot, Mugu, Pyuthan, Rolpa, Rukum, Salyan, Baitadi, Dadeldhura, Darchula, Achham, Bajhang, Bajura and Doti). The technical component of this project is implemented by FAO. The project does not cover the districts identified for this LDCF project. However, further consultations will be planned through the existing steering committee mechanisms from the beginning to avoid potential duplication.~~

Pilot Programme for Climate Resilience (PPCR) (2015 – 2018): PPCR is funded by Climate Investment Funds and the fund (a budget of USD 31,300,000) is administered by Asian Development

[12] http://documents.worldbank.org/curated/en/2007/05/8383289/nepal-irrigation-water-resources-management-project.

Bank (ADB), the International Finance Corporation (IFC) and the World Bank. Ministry of Science Technology and Environment (MOSTE) supervise the projects. This project aims to increase resilience to climate-related hazards by improving the accuracy and timeliness of weather and flood forecasts and warnings for vulnerable communities, as well as by developing Agricultural Management Information System (AMIS) to help farmers mitigate climate-related production risks. This is planned to be achieved by establishing multi-hazard information and early warning systems, upgrading the existing hydro-meteorological system and agricultural management information system, and enhancing institutional and technical capacity. The proposed LDCF component 2 is related to this initiative and hence the synergies and complementarities will be considered to enhance effectiveness.

PPCR works with DHM for generating weather forecast and prediction and NARC to develop agro-advisory system that can include use of drought and flood resistant crop and improved production technology. District Energy, Environment and Climate Change Unit (DEECU) that represents Alternative Energy Promotion Center (AEPC) in the district is proposed as an implementing arm of the PPCR project. The DEECC draws representatives from all relevant agencies and their district implementing structures. This Unit is chaired by the Local Development Officer (LDO) and the secretariat is the District Energy and Environment Section (DEES). This section is responsible for coordinating all climate-related programs; ensuring synergies; and avoiding duplication and overlap. Though there is only one district Siraha overlapping with PPCR, the tools developed under PPCR will be used for this project in other districts as well. This project needs support to coordinate livelihood related meetings of the DEECC.

The LDCF project resources will not duplicate the planned activities of PPCR, but will compliment and establish synergy and make use of the early warning products and information for agricultural applications at local level in selected VDCs of 4 districts by engaging existing Farmer Field Schools (FFS). Further, the PPCR component D on creation of an Agricultural Management Information System (AMIS), development of agro-meteorological information products and capacity building covers only broader agricultural stakeholders within the Ministry of Agricultural Development (MOAD). But this LDCF will focus strengthening of current crop assessment role of Agribusiness Promotion and Statistics Division (ABPSD) by providing hands-on training on FAO's standard agro-meteorological tools and methods.

The existing Steering Committee for climate change adaptation and disaster risk management will provide necessary coordination mechanism and bring in services of other ministries. The Department of Hydrology and Meteorology (DHM) is also a member of the Steering Committee led by the Ministry of Agriculture and Development (MOAD) and thus potential overlaps with respect to component 2 of the project will be avoided. There is already a mechanism in place to coordinate research and extension (DOA/DLS/NARC) within the Ministry of Agriculture and Development. NARC will be involved in assessment of climate change impacts using model based analysis and the results will be better delivered on the ground applications especially to select adaptation strategies.

Coordination with initiatives of development partners will be enhanced by sharing information through climate change and development portal and Nepal Climate Change Knowledge Management Centre. Particular emphasis will be given to coordinate with other similar initiatives: UNDPs initiatives include - LDCF on Community Based Flood and Glacial Lake Outburst Risk Reduction, Comprehensive Disaster Risk Management Programme (CDRMP), Regional Climate Risk Reduction Project in the Himalayas (RCRRP) and Climate Risk Management Technical Assistance Support Project (CRM-TASP).

The proposed LDCF project will coordinate with a number of other initiatives by USAID on Sacred Himalayas Landscape, Hariyo Ban, and International Centre for Integrated Mountain Development's (ICIMOD) initiatives related to GLOF risk monitoring, SERVIR Himalaya (which deal with drought monitoring among others), UNEP's proposed GEF LDCF project focusing on NAPA combined profile on ecosystem management for climate change adaptation and Emergency Flood damage and Rehabilitation Project of ADB.

Nepal Climate Change Support Programme (NCCSP): Funded by DFID and the EU (USD 22,380,000), supports the Ministry of Science, Technology and Environment (MOSTE) to operationalize the Local Adaptation Plan of Action (LAPA). The first phase (2012-2015) of the NCCSP is implemented in 69 VDCs and one municipality in 14 districts in Mid and Far Western Development Regions. The beneficiaries are 300 thousand poor and most poor vulnerable people, disadvantaged and marginalized groups. The project develops district vulnerability profiles and VDC-level vulnerability ranking for the districts in Karnali zone. In each of the project districts, NCCSP implemented LAPA in five VDCs. NCCSP supports the most immediate and urgent needs in the plans that target most vulnerable wards, communities and households. The proposed project, though in different geographic areas, can benefit from the experience of NCCSP in planning, preparation and implementation of LAPA. Literature developed by the NCCSP on the process of adaptation planning at local level, including training manuals for mobilizers will be highly useful. The brief description of LAPA preparation process is provided in the Annex.

Community based Flood and Glacial Lake Outburst risk reduction project (CFGORRP): CFGORRP, a USD 7,250,000 project for 2014 to 2017, is a joint undertaking of the GoN, GEF and UNDP. The lead implementing agency is the DHM. The objective is to reduce human and material losses from GLOF in Solukhumbu district and catastrophic flooding events in Udayapur, Siraha, Saptari and Mahottari districts. The project has two components, reducing risk of GLOF from Imja Lake and reducing losses of human and materials from recurrent floods in downstream areas. The specific project areas cover 8 VDCs of downstream four districts along river basins of Ratu, Khando and Gagan rivers, and Trijuga River, Hadiya and Kong tributary basins. Community-based early warning system (CBEWS) and strengthening of individual and institutional capacities for GLOF risk management can complement with the adaptation efforts of the proposed project in Udayapur and Siraha districts. Village Disaster Management Plans prepared and district line agency representatives trained on flood risk management will be useful for the proposed project as well.

Himalayan Adaptation, Water and Resilience (HI-AWARE): ICIMOD is developing a proposal for HI-AWARE research on Glacier and Snowpack Dependent River Basins in collaboration with Bangladesh Centre for Advanced Studies (BCAS), Energy Research Institute (TERI), Alternate Energy and Water Resources Institute (CAEWRI) of Pakistan Agricultural Research Council (PARC), and Alterra-WUR, Wageningen, the Netherlands. The stated goal of the project is to develop robust evidence to inform people-centred policies and practices for enhancing the adaptive capacities and climate resilience of the poorest and most vulnerable populations in the mountains and floodplains of Indus, Ganges and Brahmaputra rivers for improving their livelihoods. Knowledge generated by this project can be helpful to understand wider regional policies on adaptation that can complement the knowledge generated from the proposed project.

Nepal Climate Change Knowledge Management Centre (NCCKMC): MOSTE and Nepal Academy of Science and Technology (NAST) hosted Nepal Climate Change and Development Portal (www.climatenepal.org.np) with supports of DANIDA, DFID, GEF and UNDP. This portal is the main outlet for Nepal Climate Change Knowledge Management Centre (NCCKMC) developed under the NAPA project. The portal is to serve as a platform for coordinating and facilitating dissemination of climate-related knowledge for building capacity of the stakeholders. However, most of the Nepalese farmers have no access to internet and cannot read materials in English. This project will draw the experiences from various projects and consider development of adaptation options to be implemented in the selected districts.

Coordination with USAID's Feed the Future initiative and other relevant programs at both the national and district level: Coordination will be ensured with relevant programmes of USAID on climate change adaptation. Some of the programmes and projects are described below.

Initiative for Climate Change Adaptation: USAID under US Feed the Future Initiative funded a $ 2 million five-year project (2012- 2017) "Initiative for Climate Change Adaptation (ICCA)" developed

by IDE, Rupantaran and Resource Identification and Management Society Nepal (RIMS-Nepal). The project is to support targeted communities to adapt to adverse climate change impacts. More specifically, the project is to strengthen government capacity to implement policies on climate change adaptation and support planning to link forestry and agriculture. It is also to identify and facilitate suitable adaptation interventions, innovations, and technologies to enhance capacity of the community to improve livelihoods. It is also to help communities develop and implement LAPA and promote systems that allow stakeholders to participate in monitoring and evaluating climate change adaptation. The project is to improve climate change planning and develop resilient income streams for 20 000 households in 8 districts (Nawalparasi, Rupandehi, Kapilbastu, Dang, Kaski, Parbat, Syangja and Rolpa) in western and mid-west development region of Nepal. The project is also to establish Community Climate Resource Centers (CCRC) with weather stations to measure temperature and rainfall. The project under implementation has already supported 10 VDCs to prepare their Local Adaptation Plan of Action; installed micro-irrigation technologies and broadcasted radio jingles on climate change adaptation for local FM radios. One district Kapilbastu of the ICCA is common to the proposed GEF project. Any overlap in project VDCs is avoided in consultation with IDE Nepal. The experiences gained from this project will be helpful to implement the GEF project.

CSISA Nepal: Cereal Systems Initiative for South Asia Nepal (CSISA) is part of the Feed the Future Presidential Initiative that addresses key production challenges in rice, lentils and maize. CSISA Nepal receives most of its funding from USAID Nepal, with additional support from USAID Washington and the Bill & Melinda Gates Foundation. The project was launched in the fall of 2012. It is led by CIMMYT and partners are IRRI, IFPRI and ILRI. It aims to increase seed supply and demonstrate conservation tillage. CSISA Nepal supports the KISAN project of USAID and focuses on the mid-hill and Terai districts of Banke, Dadeldhura, Achham and Surkhet. Located in the mid-west and far west development zones of Nepal, CSISA Nepal's four priority districts also fall within USAID's Feed the Future target area 16 districts where it invests significant resources to combat household food insecurity. The project priorities include increasing the supply and accessibility of high quality seeds, farm mechanization and management technologies. The activities include an explicit focus on training for women farmers as well as providing technical backstopping for the newly funded KISAN project. One Adaptive Research and Training Center (ARTC) is established in each district and their locations were chosen based on a number of agronomic, socioeconomic and logistic factors.

CSISA Nepal activities include on-farm lentil trials to assess the effects of improved practices and spring maize trials with new hybrids and farm varieties to assess their performance under different management practices. It also facilitates access for women farmers to women-friendly, scale-appropriate machinery, including two-wheel tractors, seed drill and rice and wheat harvesting equipment. It will also do a participatory market chain analysis focused on three Terai districts (Kailali, Banke and Dang) to understand opportunities and constraints for strengthening seed systems and making markets work for smallholders.

KISAN: Knowledge-based Integrated Sustainable Agriculture and Nutrition Project (KISAN) is USAID's five-year (2013-2018), $20.4 million project under Feed the Future initiative in Nepal. The project is a part of the Presidential Feed the Future (FTF) Initiative in Nepal. The project seeks to sustainably reduce poverty and hunger in Nepal by achieving inclusive growth in the agriculture sector, increasing income of farm families and improving nutritional status, especially of women and children in over 160,000 households. USAID will implement the project from 2013-2018 with Winrock International in collaboration with five Nepali organizations: Antenna Foundation Nepal; Development Project Service Center (DEPROSC); Center for Environmental and Agricultural Policy, Research, Extension and Development (CEAPRED); Nutrition Promotion and Consultancy Services (NPCS); and Nepal Water for Health (NEWAH).

KISAN is expected to impact one million Nepalese in 20 districts namely Kapilbastu, Palpa, Argakhachi, Gulmi, Banke, Bardiya, Surkhet, Dailekh, Jajarkot Dang, Salyan, Rukum, Rolpa, Pyuthan, Baitadi, Kailali, Kanchanpur, Doti, Accham, Dadheldhura. Two of the project districts Kapilbastu and Argakhachi are common to the proposed GEF project. However, this project has not

been considered as a potential baseline project due to slightly different focus including nutritional aspects and that LDCF project does not specifically addresses the nutritional issues. But, there are opportunities with respect to promoting complementarities by introducing sustainable agricultural practices. However, this project has not been considered as a potential baseline project due to slightly different focus including nutritional aspects and that LDCF project does not specifically addresses the nutritional issues. But, there are opportunities with respect to promoting complementarities by introducing sustainable agricultural practices.

Agriculture and Food Security Project: Ministry of Agricultural Development (MOAD), Ministry of Health and Population (MOHP), the U.S. Agency for International Development (USAID), and the World Bank are jointly launched a five year project Agriculture and Food Security Project (AFSP) in 2013 funded by Global Agriculture and Food Security Program (GAFSP). The projects will work in the west, mid-west, and far-west regions of the country. This project aims to improve food security situation of 150,000 poor and marginal households by increasing agricultural production and productivity, increasing livelihood options and household income, and improving utilization of food. The program will be implemented by MOAD with support from MOHP, with monitoring and supervision provided by the World Bank.

The project has four main components: technology development and adaptation; technology dissemination and adoption; food and nutritional status enhancement and project management. The priority target groups of the project are small and marginal farmers, landless households, indigenous population, and Dalits. The project is to be implemented in 19 hill and mountain districts of the mid- and far-western development regions of Nepal: Darchula, Baitadi, Bajhang, Bajura, Humla, Jumla, Dolpa, Mugu, Kalikot, Surkhet, Dailekh, Jajarkot, Salyan, Rukum, Rolpa, Pyuthan, Accham, Dadheldhura and Doti. Though none of the project district is common to the proposed GEF project, the lessons learnt will be worth exchanging.

Hariyo Ban (green forest): USAID, under US Global Climate Change Initiative, is implementing a $29.9 million five-year project Hariyo Ban (green forest) in Nepal. The project is designed to reduce threats to physical and biological diversity. It is also being implemented in Terai Arc Landscape and Chitwan-Annapurna Landscape. The project is aimed to build resilience to climate change in communities and ecosystems by conserving forests to improve livelihoods. It is implemented in close collaboration with the GON, CARE Nepal, National Trust for Nature Conservation and FECOFUN (Federation of Community Forestry Users Groups in Nepal).

Ways and means to avoid duplication and to enhance synergies

Consultations with stakeholders and development partners are the important step followed to avoid duplication and promote synergies among the existing and pipeline projects. Relevant consultations at national, district and local levels provided in depth knowledge of ongoing and completed projects. Those consulted at the central level include key government ministries such as MOAD, MOSTE, MOFALD, and MOHA; research partner NARC; key departments such as DOA, DLS, DHM, DOE, DOWIDM, DOI; related development partners; nongovernmental organizations like Practical Action; and UN agencies involved in climate change related programs.

At the district level, DADO, DLSO, CDO, DDC and development agencies working in the district were consulted. At the village level, VDC Secretaries, Ex Chief/members of the VDCs, local farmers, women farmers, agricultural technicians, elderly farmers, school teachers, and development workers were consulted. The detailed local level consultations for project design were carried out during March- May 2014. PPG workshop was participated by all the major stakeholders and development partners and thus the event ensured alignment of the project activities without duplication. All relevant stakeholders and development partners will be invited in project inception workshop to avoid duplication at the implementation level and develop synergies in the efforts of the project. Project Steering Committee will consist of major government agencies concerned with climate change

adaptation and the institutional arrangement will provide a forum to share related initiatives by different ministries.

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At the district level, District Agriculture Development Committee (DADC) will coordinate all the agriculture related activities in the district including the activities of all the related projects. The project will be implemented through DADO and DLSO that ensures synergies with other programs and projects. Under the system of devolution, DDC approves all the programs of DADO and DLSO ensuring coordination among all the programs in the district. Progress reporting will be done in trimester and annual review meetings at the district, regional and central levels. At the local level, Local Adaptation Plans for Action (LAPA) Manual developed by MOSTE will be adhered to while developing LAPA in the VDCs. The project VDCs for development of LAPA are already identified and shared in PPG workshop to avoid overlaps with other agencies.

4.2 IMPLEMENTATION ARRANGEMENTS

The project will be executed by FAO through Direct Execution (DEX) modality in close consultation with MOAD. FAO and the MOAD will be the main co-partners for project implementation. The implementation will be supported by NARC, DOA, and DLS at central level and at their field offices - located in the regions and districts where the LDCF project will be implemented. At local level, key stakeholders and beneficiaries will be the local governance bodies such as DDC (District Development Committee), VDCs (Village Development Committees), and community-based organizations (CBOs).

Project beneficiaries will be the poor and marginalized communities, and small-scale farmers, who are the most vulnerable to climate risks. The project will be executed in most vulnerable areas of Nepal, exposed to climate impacts, with no-access or low-access to information, knowledge and education; lack of resources, assets and income sources; and that rely on marginal and climate risk-prone and degraded lands. Areas which possess less access to community and governmental services to cope with climate change risks.

All assistance to the local beneficiaries will be channelized through the Farmers Field Schools (FFS). Farmers of 25 to 30 in number (no more than one from a household) with similar interest and inhabiting in the village will form/strengthen their group and participate in FFS. Farmers organized in the FFS will do planning and implementation of the FFS. They will implement livelihood improvement programs. After completion of a full year cycle of the FFS they will continue the FFS with the least support of FFS facilitators.

FAO will provide supervision and oversight, as well as technical assistance in strengthening technical and institutional capacity for climate change adaptation, assessment, monitoring and provision of advance early warning information on vulnerabilities, risks and agro-meteorological forecasts to assist better adaptation planning and promoting community based adaptation to strengthen livelihood strategies and sustainable climate resilient agricultural practices.

Risk and vulnerability assessment and mapping, and the LAPAs will be designed in collaboration with local actors: DDCs, local government agencies, local and indigenous communities, civil society, private sector organizations, and locally based NGO/INGOs and CBOs. Local communities will actively participate in awareness-raising activities and demonstrations, to better understand CC impacts and risks. Thus, they will be able to evaluate by themselves the sustainable adaptation options.

Project Steering Committee (PSC): The Project Steering Committee established under the FAO-TCP project, which includes MOAD, FAO, MOHA, MOE, DHM, NARC, UNDP and others will be responsible for major decisions on project coordination and administration. The project Steering Committee (PSC) will be chaired by Secretary MOAD. The PSC will give strategic directions to the project. It will approve adjustments in project plan and budget, if any and will also the progress review of the project. The PSC will meet twice a year. The MOAD will appoint a National Project Director

(NPD) and the NPD will be the main linkage of the project team with the government. The NPD will support the PMU in day to day functioning of the project activities.

The Government will provide office space and administrative support to missions and meetings and will make arrangements for the clearance of international experts, custom clearance of project equipment. The MOAD will assist establishment of technical implementation task group in the districts. The government will initiate and support local level authorities in providing umbrella supports to farmers groups. The MOAD will identify potential participants for the training courses, and will release the selected staff from the various departments involved in project implementation from their normal duties to ensure their participation at the training, workshops and demonstration activities at village level, and to fulfil other commitments related to the project's training activities at the pilot sites. The District Agriculture Development Office (DADO) and District Livestock Service Office (DLSO) will provide necessary supports in project implementation.

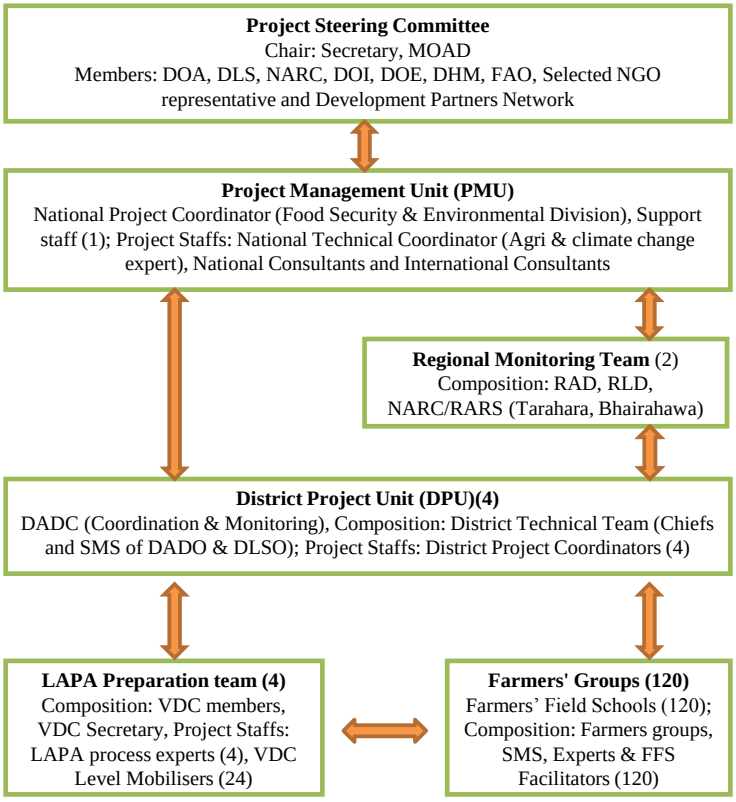

Figure 1: Project Management Flow Chart

Project management structure and roles and responsibilities of executing partners

Project Management Unit (PMU): The PMU has responsibilities of full implementation the project. It will help NPD in organizing PSC and other meetings, workshops, and training programs for capacity building. The Unit will support Project Coordinators in the districts, Mobilisers in the VDC and also FFS facilitators working in the villages. It will also coordinate for LAPA preparation. It will conduct periodical monitoring, evaluation, documentation, and reporting.

The PMU will be located in MOAD (or any other place provided by MOAD) and will act as secretariat to the PSC. The PMU will be led by National Technical Coordinator (NTC) (agriculture and climate change expert), a full time project position, in close collaboration with NPD. The NTC will have an Admin cum Finance staff. The PMU will also recruit four District Technical Coordinators one for each district, and 24 VDC level mobilizers one for each VDC. The project staff in the PMU

will be recruited by FAO and report to the BH. The PMU will carry out its functions in line with FAO rules and regulations.

The following are some of the key functions of the PMU:

- to technically identify, plan, design and support all activities;
- to liaise with government agencies and to regular advocate on behalf of the Project;
- to prepare the Annual Work Plan and Budget (AWP/B);
- to be responsible for day-to-day implementation of the project in line with the AWP;
- to ensure a results-based approach to project implementation, including maintaining a focus on project results and impact as defined by the RF indicators;
- to coordinate project interventions with other ongoing activities and to monitor project progress;
- to be responsible for the elaboration of FAO PPRs and the annual PIR, and;
- to facilitate and support the midterm review.

The PMU will also be supported by a series of national and international consultants to provide short term inputs to the Project. These will be finalised during inception, and are tentatively identified as:

Table 5: Service inputs

Expert	**Unit**	**Number of units**
International Consultants		
Knowledge Management & Communication Expert	Weeks	6
Climate impacts, climate information systems and data analysis Expert	Weeks	8
National consultants		
National Technical Coordinator (NTC)	Months	48
Capacity development expert	Months	18
District Technical Coordinators (4)	Months	168
Operation and Monitoring Expert	Months	48
Finance and operations assistant	Months	48
Driver	Months	45
Livestock Expert	Months	18
Livelihoods and Gender Expert	Months	18
Climate data analysis and climate infromation systems Expert	Months	9
Crop monitoring and yield forecasting Expert	Months	9
Policy and mainstreaming expert	Months	12
Knowledge management and communication strategy expert	Months	3
VDC level Mobilisers (24)	Months	576

Terms of Reference for all short and long term personnel are provided in Annex XI

The National Project Director (NPD): The NPD will be a senior staff member designated by MOAD, and will be the lead person responsible for ensuring smooth execution of the project on behalf of the Government of Nepal. The salary and allowances of the NPD will be financed by the Government. The NPD is responsible to the Government for the successful implementation of the Project and the Project's impacts. The duties of the NPD include (i) acting as the responsible focal point at the MOAD; (ii) ensuring all necessary support input from Government personnel are provided by MOAD and its outfits to enable the project to implement all of the proposed component activities; (iii) reviewing and providing input to annual work plans and budgets in consultation/collaboration with the FAO; and (iv) to participate in the selection of consultants. The Terms of Reference for the NPD can be found in Annex XI.

National Technical Coordinator (NTC) (Agriculture and Climate change): The NTC will directly support the NPD in the PMU and ensure best international technical and management practices are integrated into the Project work plan and activities. The NTC reports to the BH on operational issues and to the LTO on technical issues. The NTC is a full time position for the entire duration of the project.

The NTC will support all aspects of the day-to-day execution of the Project. The NTC will also be responsible for providing technical advice and guidance in his/her area of technical expertise. The NTC will support the NPD in reporting on Project progress to PSC meetings, and will contribute to the development of semi-annual PPRs and annual PIRs. In addition the NTC will:

- Ensure latest and best international practices and approaches are reflected in the design and planning of Project Activities;
- Design and propose a participatory monitoring system for the Project's work;
- Support the National Project Coordinator in the day-to-day monitoring of Project progress and the alerting of the BH and the LTO to potential problems that could result in delays in implementation;
- Help identify consultant candidates, especially international candidates;
- Support design of the Project's work with stakeholders in the pilot areas;
- Help organize and supervise consultant inputs;
- Propose an approach to managing and sharing knowledge, and to identifying and disseminating lessons learned;
- Provide on-the-job capacity development to all members of the PMU;
- Communicate, advocate and engage in policy dialogue.

Regional Monitoring Team (RMT): The Regional Agriculture Directorates and Regional Livestock Service Directorates in Eastern and Western Development Regions are responsible for monitoring of the project implementation in the districts under their respective regions. The regional monitoring team will review the progress of the project and monitor field twice a year.

District Project Unit (DPU): The District Project Unit (DPU) will support the District Project Technical Team in need based planning to develop seasonal and annual program and budget. The DPU will organize meetings and trainings. It will also support VDC level mobilisers and village level FFS Facilitators to implement FFS and the LAPA team to formulate the LAPA. It will also monitor the field programs, organize monitoring visits by DADO, DLSO and DADC members. It will conduct evaluation of the FFS in close collaboration with facilitators. It has responsibility of overall reporting of the project to the PMU. The government agencies and direct beneficiaries in the project implementation and coordination have specific roles to play. Their roles are embedded into the project management and overall coordination for effective implementation of the project.

District Project Technical Team (DTT): There will be a district technical team formed in each district and the team will have responsibility of planning and budgeting for each season and participating in capacity building. The team will provide overall technical support to project implementation. The team will review the progress and also monitor the field once a season during the FFS. The team will also support VDC level mobilisers and FFS Facilitators. The DTT will obtain supports of VDC level stakeholders (elected officials and Secretary) while preparation, approval and implementation of LAPA. It will also facilitate supervision and monitoring. The DTT will be responsible for capacity improvement, linkages and sustainability.

District Technical Coordinator (DTC) (Agriculture/Livestock): Four DTCs will be recruited by FAO and will be responsible for the coordination and planning of all district level activities. The DTCs are the Project's key strategic mechanism for planning, coordination and implementation of the project activities. The DTC will take the lead in communicating with local government, advising on the preparation of local work plans, designing and running training for local government officials, designing and running training for DTC, designing local activities, trouble shooting at the local level, ensuring Project inputs are delivered effectively to local governments and Farmer groups, and ensuring linkages along the following communication line: Farmer groups – district – regional – National government – FAO.

VDC Level Mobiliser: There will be one mobilize in each VDC. The mobilizers will be responsible for coordinating and mobilising 5 FFS Facilitators in the VDC. The VDC level mobilises are also responsible for mobilising the VDC level stakeholders in preparation of LAPA.

FFS Facilitators: There will be 120 FFS facilitators, one for each FFS. Their main job is to help the farmers groups to plan FFS and implement FFS with supports of SMS/Experts. S/he will also support the farmers for continuation of FFS. The facilitators are also to support LAPA preparation process at the VDC level. They are to report leaning and progress of the FFS to DPU.

Project Implementers: The project implementers include: NARC, DOA, DLS, and DHM, including their regional and district level offices. The implementers will work closely with the MOAD through their nominated technical focal points at the national and local levels. The role of NARC will be to provide agro-advisory services based on agro-meteorological information provided by DHM. The NARC will also be responsible for providing seeds of stress tolerant varieties and animal breeds. Outreach centers of NARC will also be responsible for supporting FFS.

Other partners: Letters of Agreement (LoA) will be elaborated and signed between FAO and the respective collaborating partners. This will include government and civil society organizations and technical agencies. Funds received under an LoA will be used to execute Project activities in conformity with FAO's rules and procedures.

FAO's role and responsibilities, both as the GEF Agency and as an executing agency, including delineation of responsibilities internally within FAO

FAO will be the GEF implementing and executing agency. As the GEF Agency, FAO will be responsible for Project oversight to ensure that project implementation adheres to GEF policies and criteria, and that the Project efficiently and effectively meets its objectives and achieves expected outcomes and outputs as delimited in the Project document. FAO will report on Project progress to the GEF Secretariat and financial reporting will be to the GEF Trustee. FAO will closely supervise and provide technical guidance to the Project by drawing upon its capacity at the global, regional and national levels, through the concerned units at FAO-HQ, the Regional Office in Bangkok and the FAO Representation in Nepal.

In addition, at the request of the Government of Nepal, the project will be executed by FAO via its Direct Execution (DEX) modality in close consultation with MOAD. FAO, in consultation with the NPD, will deliver procurement and contracting services to the project using FAO rules and procedures, as well as financial services to manage the GEF resources. For more detail, please see description below.

Executing Responsibilities: The project will be implemented under FAO's Direct Execution modality. The FAO Representative in Nepal will hold the budget and operational responsibilities of the project. The budget holder (BH) will schedule the technical backstopping and monitoring missions as required. The FAO Representative will ensure timely operational, administrative and financial management of the Project's GEF resources, including the disbursement of funds. The BH will in consultation with the NPD: (i) review and clear annual work plans and budgets and monitor them once approved; (ii) review procurement and subcontracting material and supporting documentation and obtain internal FAO approvals; (iii) schedule technical backstopping and monitoring missions; (iv) participate in project supervision missions; (v) prepare financial and monitoring reports (see section "Financial management of and reporting on GEF resources" below); (vi) provide operational oversight to contracted activities carried out by the Project partners; and (vii) prepare budget revisions; (viii) be accountable for safeguarding resources from inappropriate use, loss, or damage; (ix) be responsible for addressing recommendations from oversight offices, such as Audit and Evaluation; and (x) establish a multi-disciplinary FAO Project Task Force to support the project.

Operations and reporting - including the procurement of goods and contracting of services for Project activities - will be done in accordance with FAO rules and procedures. As such, FAO will, in close coordination with the NPD, be responsible for the timely recruitment of key project posts listed above. In accordance with FAO rules and procedures, final approval of the use of GEF resources rests with the FAO Representation in Nepal.

The FAO Lead Technical Unit (LTU): The Climate, Energy and Tenure Division (NRC) of FAO will be the LTU within FAO for this Project and will provide overall technical guidance to its implementation. The responsibility for direct technical backstopping and supervision of the project activities and results will be with the FAO Regional Office for Asia Pacific (RAP).

FAO Lead Technical Officer (LTO): The Land and Water Officer of RAP/NREG will be the LTO for the Project and will have primary accountability for the timeliness and quality of the technical services provided throughout project execution. The LTO will work in close collaboration with the National Project Director (NPD). Under the general technical oversight of the LTU, the LTO will provide technical guidance to the Project team to ensure delivery of quality technical outputs. The LTO will coordinate the provision of appropriate technical backstopping from all the concerned FAO units represented in the Project Task Force. The primary areas of LTO support to the project include:

- review and ensure clearance by the relevant FAO technical officers of all the technical Terms of Reference (TOR) of the project team and consultants;
- ensure clearance by the relevant FAO technical officers of the technical terms of reference of the Letters of Agreement (LoA) and contracts;
- In close collaboration with MOAD and NPD, lead the selection of the project staff, consultants and other institutions to be contracted or with whom an LoA will be signed;
- review and clear technically reports, publications, papers, training material, manuals, etc.;
- monitor technical implementation as established in the project RF;
- review the Project Progress Reports (PPRs) and prepare the annual Project Implementation Review (PIR);
- Provide technical support to the National Technical Coordinator;
- Provide technical inputs to procurement and contract documentation;
- Review and clear final technical products delivered by consultants and contract holders financed by GEF resources before the final payment can be processed;
- Support the PMU in preparing the AWP/B, with support from the Budget Holder and clearing it prior to submission to the PSC

FAO Project Task Force (FAO-PTF): The FAO-PTF will be led by the Budget Holder and include the LTU, LTO and GEF Coordination Unit, and other technical units supporting the project's work. The main role of the task force is to provide technical guidance to the LTO and the PMU for the implementation of the project, contribute to specific project activities as required, and troubleshoot should implementation issues arise.

Participating units: Technical units across FAO will be involved in supporting the Project's work and in ensuring that the Project stays on track to achieve its overall objectives and indicators of success. When appropriate, these units within RAP or HQ will provide technical support in areas such as: climate change adaptation, crop and grassland services and gender. The GEF coordination unit of the FAO Investment Centre Division will provide adaptive management support and results-based management oversight and guidance to the LTU, LTO and the participating units.

FAO GEF Coordination Unit in Investment Centre Division (GCU): GCU will review and approve PPRs, annual PIRs and financial reports and budget revisions. The GCU will undertake supervision missions if considered necessary in consultation with the LTU, LTO and the BH. The PIRs will be included in the FAO GEF Annual Monitoring Review submitted to GEF by the GCU. The GCU will ensure that the project's mid-term review and final evaluation meet GEF requirements

by reviewing evaluation ToRs and draft evaluation reports. Should the PIRs or mid-term review highlight risks affecting the timely and effective implementation of the project, the GCU will work closely with the BH and LTO to make the needed adjustments in the project's implementation strategy.

The **Investment Centre Division Budget Group (TCID)** will provide final clearance of any budget revisions. The **FAO Finance Division** will provide annual Financial Reports to the GEF Trustee and, in collaboration with the GEF Coordination Unit and the TCID Budget Group, call for project funds on a six-monthly basis from the GEF Trustee.

4.3 FINANCIAL PLANNING AND MANAGEMENT

4.3.1 Financial plan (by component, outputs and co-financier)

Table 6. Financial plan

Component	Co-funders			**GEF**	**Total**
	FAO/ UTF	FAO/ MTF	Government		
Component 1	-	-	671,429	300,000	**971,429**
Component 2	-	-	1,800,000	350,000	**2,150,000**
Component 3	1,202,000	-	560,000	311,427	**2,073,427**
Component 4	7,068,000	1,070,000	-	1,600,000	**9,738,000**
Project Management	350,000	100,000	168,571	128,071	**746,642**
Total	**8,620,000**	**1,170,000**	**3,200,000**	**2,689,498**	**15,679,498**

4.3.2 GEF/LDCF/SCCF inputs

The GEF funds will finance inputs needed to generate the outputs and outcomes under the Project. These include: (i) local and international consultants for technical support and Project management; (ii) Strengthening of technical and institutional capacities and integrating adaptation into national food and agriculture policies, strategies and plans; (iii) assessment, monitoring and providing advance early warning information on vulnerabilities,risks of climate change and agrometeorological forecasts to assist better adaptation planning; (vi) LoA/contracts with technical institutions and service providers supporting the delivery of specific Project activities on the ground; (v) Improving awareness, knowledge and communication on climate impacts and adaptation; (vi) Prioritizing and implementing local investment by promoting Community Based Adaptation (CBA) to strengthen livelihood strategies and transfer of adaptation technology in targeted areas. Dissemination international flights and local transport and minor office equipment; and (vi) training and awareness raising material.

4.3.3 Government inputs

The Government of Nepal, through the MOAD will provide in-kind support in terms of office facilities (including electricity, telephone and fax line, cleaning, etc.) and time of key staff, including the NPD. The district level offices will provide technical assistance, coordination and participation in project activities. The Government will also provide substantial investments into agriculture and livestock across all the selected districts. These investments – both cash and in-kind – are estimated to value in total of US$ 3.2 million during the project period.

4.4.4. FAO inputs

FAO will provide technical assistance, backstopping, training and supervision of the execution of activities financed by GEF resources. The GEF project will complement and be co-financed by several

projects and activities implemented by the FAO Representation in Nepal funded by the FAO by various donors through trust fund arrangements and the Government.

With a total value of USD 12.99 these contributions will be managed as an integral part of the GEF project by FAO and will be assessed and recorded each year by the Project team in accordance with GEF policies and procedures.

4.4.5 Other co-financiers inputs

Table 7. Co-financing inputs, volume and agency

Project name	Relevant activity	Co-financing volume (USD Millions)	Agency
Agriculture and food security project (2014 – 2018)	Contribute to nutrition and livelihood through farmer field schools (FFS)	8.62	FAO/UTF
Ginger Competitiveness Project (March 2012 – June 2015)	Increase income level of ginger farmers through improvements in SPS arrangements and value addition for export	1.17	FAO/MTF
Government of Nepal investment in selected districts (annual)	Capacity building of farmers and transfer of technology	3.20	Government

4.4.6. Financial management of and reporting on GEF/LDCF/SCCF resources

Financial Records: FAO shall maintain a separate account in United States dollars for the Project's GEF resources showing all income and expenditures. Expenditures incurred in a currency other than United States dollars shall be converted into United States dollars at the United Nations operational rate of exchange on the date of the transaction. FAO shall administer the Project in accordance with its regulations, rules and directives.

Financial Reports: The BH shall prepare six-monthly project expenditure accounts and final accounts for the project, showing amount budgeted for the year, amount expended since the beginning of the year, and separately, the un-liquidated obligations as follows:

1. Details of project expenditures on a component-by-component and output-by-output basis, reported in line with project budget codes as set out in the Project document, as at 30 June and 31 December each year.
2. Final accounts on completion of the Project on a component-by-component and output-by-output basis, reported in line with project budget codes as set out in the Project document.
3. A final statement of account in line with FAO Oracle Project budget codes, reflecting actual final expenditures under the Project, when all obligations have been liquidated.

The BH will submit the above financial reports for review and monitoring by the LTO and the FAO GCU. Financial reports for submission to the donor (GEF) will be prepared in accordance with the provisions in the GEF Financial Procedures Agreement and submitted by the FAO Finance Division.

Budget Revisions: Semi-annual budget revisions will be prepared by the BH in accordance with FAO standard guidelines and procedures. The budget revision will take into consideration the status of the implementation of the project activities towards achieving specific outputs and outcomes.

Responsibility for Cost Overruns: The BH is authorized to enter into commitments or incur expenditures up to a maximum of 20 percent over and above the annual amount foreseen in the Project budget under any budget sub-line provided the total cost of the annual budget is not exceeded.

Any cost overrun (expenditure in excess of the budgeted amount) on a specific budget sub-line over and above the 20 percent flexibility should be discussed with the GCU/TCIB with a view to ascertaining whether it will involve a major change in Project scope or design. If it is deemed to be a minor change, the BH shall prepare a budget revision in accordance with FAO standard procedures. If it involves a major change in the Project's objectives or scope, a budget revision and justification should be prepared by the BH for discussion with the GEF Secretariat.

Savings in one budget sub-line may not be applied to overruns of more than 20 percent in other sub-lines even if the total cost remains unchanged, unless this is specifically authorized by the GCU upon presentation of the request. In such a case, a revision to the Project document amending the budget will be prepared by the BH. Under no circumstances can expenditures exceed the approved total Project budget or be approved beyond the NTE date of the project. Any over-expenditure is the responsibility of the BH.

Audit: The Project shall be subject to the internal and external auditing procedures provided for in FAO financial regulations, rules and directives and in keeping with the Financial Procedures Agreement between the GEF Trustee and FAO. The audit regime at FAO consists of an external audit provided by the Auditor-General (or persons exercising an equivalent function) of a member nation appointed by the Governing Bodies of the Organization and reporting directly to them, and an internal audit function headed by the FAO Inspector-General who reports directly to the Director-General. This function operates as an integral part of the Organization under policies established by senior management, and furthermore has a reporting line to the governing bodies. Both functions are required under the Basic Texts of FAO which establish a framework for the terms of reference of each. Internal audits of accounts, records, bank reconciliation and asset verification take place at FAO field and liaison offices on a cyclical basis.

4.4. PROCUREMENT

Procurement planning should be in accordance with the Rules and Regulations of FAO. It requires analysis of needs and constraints, including forecast of the reasonable timeframe required to execute the procurement process. Procurement and delivery of inputs in technical cooperation projects follow FAO's rules and regulations for the procurement of supplies, equipment and services (i.e. Manual Sections 502 and 507). *Manual Section 502*: "Procurement of Goods, Works and Services" establishes the principles and procedures that apply to procurement of all goods, works and services on behalf of the Organization, in all offices and in all locations, with the exception of the procurement actions described in Appendix A – Procurement Not Governed by Manual Section 502. *Manual Section 507* establishes the principles and rules that govern the use of Letters of Agreement (LoA) by FAO for the timely acquisition of services from eligible entities in a transparent and impartial manner, taking into consideration economy and efficiency to achieve an optimum combination of expected whole life costs and benefits.

As per the guidance in FAO's Project Cycle Guide, the BH will draw up an annual procurement plan for major items which will be the basis of requests for procurement actions during implementation. The plan will include a description of the goods, works, or services to be procured, estimated budget and source of funding, schedule of procurement activities and proposed method of procurement. In situations where exact information is not yet available, the procurement plan should at least contain reasonable projections that will be corrected as information becomes available.

4.5 MONITORING AND REPORTING

Monitoring and evaluation of progress in achieving project results and objectives will be done based on the targets and indicators established in the project Results Framework (RF) (Annex I). The project Monitoring and Evaluation Plan has been budgeted at USD 99,000 (Table 1). Monitoring and evaluation activities will follow FAO and GEF monitoring and evaluation guidelines. The Project monitoring and evaluation approach will also facilitate learning and mainstreaming of project

outcomes and lessons learned into good practice as well as national and local policies, plans and practices.

Impact of the field demonstrations on the improvement of adaptive capacity and enhancement of the economic benefit by the adaptation practices will be assessed based on the feedback from farmer groups and household survey. The data will be compared with the baseline study collected at the beginning. The good practices will be screened based on the indicators: environment friendliness, potential to reduce the impacts of climate risks, economic viability, sustainability, social acceptability, gender sensitivity, income generation, enterprise diversification, seasonal relevance and community's need.

4.5.1 Oversight and monitoring responsibilities

Monitoring and evaluation of adaptation project poses challenge due to wider ramification of the costs and benefits with externalities and spill-overs. Monitoring of the project outputs and outcomes will be done regularly throughout the project period. Output indicators and outcome indicators will be used for monitoring. The monitoring measures will be the following: 1) Trimester and annual reports of project implementation using approved format; 2) Trimester and annual review of the outputs and possible outcomes; 3) Progress review at the regional level and in district level line agencies; 4) National level progress review; 5) Project Steering Committee meeting in half yearly interval; 6) Field visits and observations by the district technical teams; and 7) Discussions with the farmers groups.

4.5.2. Indicators and information sources

Due to long term nature of impact and many uncertainties in the impacts the adaptation lacks an agreed metric to determine effectiveness. As the statistical approach of impact evaluation is not feasible under the given rural setting with dearth of quantitative data and lack of a comparable control group, participatory method will be followed using rapid assessment ex-post impact evaluations. For purpose, the indicators identified will be used. Participatory methods allow the farmers groups to identify changes resulting from the adaptation project. It will also help to look distributional effects through who has benefited and who has not. This method also helps us to identify the strengths and weaknesses of the projects for future intervention, replication and up-scaling.

4.5.3 Reporting schedule

Specific reports that will be prepared under the M&E programme are: (i) project inception report; (ii) Annual Work Plan and Budget (AWP/B); (iii) PPRs; (iv) annual PIR; (v) technical reports; (vi) co-financing reports as necessary; and (vii) terminal report. In addition, assessment of the GEF Biodiversity and SFM/REDD Tracking Tools against the baseline (completed during project preparation) will be required at midterm and final project evaluation.

Project Inception Report: Immediately after the Inception Workshop (IW), the PMU will prepare a Project inception report in consultation with the BH and other project partners. The Inception Report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the IW. To insure smooth transition between project design and inception, the IW and work planning process will benefit from the extensive input of parties responsible for providing technical support to the original project design. The report will include a narrative on the institutional roles and responsibilities and coordinating action of project partners, progress to date on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation. It will also include a detailed first year AWP/B, a detailed project monitoring plan based on the monitoring and evaluation plan summery presented below. The draft inception report will be circulated to the LTO and the GCU and the NPD for review and comments before its finalization, no later than one month after the IW. The report should be cleared by the BH, LTO and the GCU and uploaded in Field Programme Management Information System (FPMIS) by the BH.

Annual Work Plan and Budget (AWP/B): The draft of the first AWP/B will be prepared by the PMU in consultation with the Project Task Force and reviewed at the project IW. IW inputs will be incorporated and the PMU will submit a final draft AWP/B within two weeks of the IW to the BH. For subsequent AWP/B, the PMU will organize a project progress review and planning meeting for its review. Once comments have been incorporated, the BH will circulate the AWP/B to the LTO and the GCU on a no-objection basis prior to uploading in FPMIS by the BH. The AWP/B must be linked to the project's RF indicators so that the project's work is contributing to the achievement of the indicators. The AWP/B should include detailed activities to be implemented to achieve the project outputs and output targets and divided into monthly timeframes and targets and milestone dates for output indicators to be achieved during the year. A detailed project budget for the activities to be implemented during the year should also be included together with all monitoring and supervision activities required during the year (See AWP/B format in Execution Agreement Annex 6.B).

Project Progress Reports (PPR): PPRs will be prepared based on the systematic monitoring of output and outcome indicators identified in the project's RF (Annex I). The purpose of the PPR is to identify constraints, problems or bottlenecks that impede timely implementation and to take appropriate remedial action. In consultation with the NPD, the PMU will prepare semi-annual PPRs and submit them to the BH in a timely manner. Each PPR will be submitted by the BH to the LTO and LTU for review on a no-objection basis. In the event of LTO/LTU/GCU comments, the PMU will incorporate them and the revised PPR is re-submitted to the LTO for final endorsement prior to final approval by the Government, uploading in FPMIS and sharing with stakeholders.

Annual Project Implementation Review (PIR): The PMU will prepare the annual PIR covering the period July (the previous year) through June (current year). The draft PIR will then be reviewed by the LTO and subsequently submitted by the BH to the GCU for review and approval no later than 10 September each year. The GCU will upload the final report on FPMIS and submit it to the GEF Secretariat and Evaluation Office as part of the Annual Monitoring Review report of the FAO-GEF portfolio. The GCU will provide the updated format when the first PIR is due.

Technical Reports: Technical reports will be prepared as part of Project outputs and to document and share project outcomes and lessons learned. The drafts of any technical reports must be submitted by the PMU to the BH who will share it with the LTO. The LTO will be responsible for ensuring appropriate technical review and clearance of said report for uploading to FPMIS. Copies of the technical reports will be distributed to Project partners as appropriate.

Co-financing Reports: The PMU will be responsible for collecting the required information and reporting on in-kind and cash co-financing as indicated in the project document/CEO Request. The PMU will submit the report to the BH in a timely manner on or before 31 July of every year covering the period July (the previous year) through June (current year).

GEF-6 Tracking Tools: Following the GEF policies and procedures, the AMAT tracking tool will be submitted at three moments: (i) with the Project document at CEO endorsement; (ii) at the project's mid-term evaluation; and (iii) with the Project's terminal evaluation or terminal report. At Project mid-term and end, the tracking tools will be completed by the PMU in close consultation with the NPD.

Terminal Report: Within two months before the end date of the Execution Agreement, the PMU will submit to the BH a draft Terminal Report. The main purpose of the Terminal Report is to give guidance at ministerial or senior government level on the policy decisions required for the follow-up of the project, and to provide the donor with information on how the funds were utilized. The Terminal Report is accordingly a concise account of the main products, results, conclusions and recommendations of the project, without unnecessary background, narrative or technical details.

The target readership consists of persons who are not necessarily technical specialists but who need to understand the policy implications of technical findings and needs for insuring sustainability of project

results. Work is assessed, lessons learned are summarized, and recommendations are expressed in terms of their application to Nepal's ongoing work to develop PFM. This report will specifically include the findings of the final evaluation. A final Project review meeting should be held to discuss the draft Terminal Report before it is finalized by the PMU and approved by the FAO LTO and the GCU.

4.5.4. Monitoring and evaluation plan summary

Table 8: Summary of the main M&E reports, responsible parties, timeframe and costs

Type of M&E Activity	Responsible Parties	Time-frame	Budgeted costs
Inception Workshop, annual planning meetings, final project workshop	PMU, supported by the LTO/LTU, BH	Inception workshop within three months of project start up, annual workshops as per the schedule and work plan agreed and final workshop a month before closure of the project	Total five workshops/planning meetings @ US$ 2000/event. Total cost works out to US$ 10,000.
Baseline survey for impact evaluation (questionnaire design, survey, travel expenses)	PMU and external experts. The project team and LTO/LTU to provide support to design the survey questionnaire.	Within three months from start of the project	USD 8 000
Mid-term Evaluation (Including questionnaire design, survey and compilation)	External Consultant in consultation with the project team and other partners (includes survey of participating households, travel expenses and report writing)	After completion of two years of implementation	USD 8 000 for independent consultants and associated costs. In addition the agency fee will pay for expenditures of FAO staff time and travel
Final impact evaluation (Including questionnaire design, survey and compilation)	FAO evaluation unit and the project team. In addition a detailed ex-post analysis will be made based on the survey with participant households (5 participants per group), survey of control households, travel expenses, impact evaluation report writing and final evaluation.	At the end of project implementation	USD 30000 for external, independent consultants and associated costs. In addition the agency fee will pay for expenditures of FAO staff time and travel
Supervision visits and rating of progress in PPRs and PIRs	LTO, other participating units	Annual or as required	The visits of the LTO/LTU will be paid by GEF agency fee. The visits of the NPD and NTC will be paid from the project travel budget
Monitoring by the Regional Directorates of DOA and DLS	Regional Directorates in close collaboration with concerned DADOs. PMU will coordinate the monitoring in collaboration with the technical experts.	Twice in a year	USD 16 000 (USD 8000 for each regional directorate for four years)
Project M & E reports (includes project progress reports, co-financing reports, terminal reports)	PMU, with inputs from NPD, NTC and other partners. The project implementation report by PMU supported by the LTO/LTU and cleared and submitted by the GCU to the GEF Secretariat.	Semi-annual/annual or as required	USD 10 000 (as completed by NTC and PMU)

Type of M&E Activity	Responsible Parties	Time-frame	Budgeted costs
Terminal Report	NTC, LTO/LTU, TCSR Report Unit	At least two months before the end date of the Execution Agreement	From respective contracts and consultants working for the project.
Total Budget			**USD 82 000**

4.6 PROVISION FOR EVALUATIONS

An independent Mid-Term Evaluation (MTE) will be undertaken towards the middle of Project Year Three to review progress and effectiveness of implementation in terms of achieving Project objective, outcomes and outputs. Findings and recommendations of this evaluation will be instrumental for bringing improvement in the overall project design and execution strategy for the remaining period of the project's term if necessary. FAO (the Office of Evaluation) will arrange for the MTE in consultation with project management. The evaluation will review the effectiveness, efficiency and timeliness of project implementation; analyse effectiveness of partnership arrangements; identify issues requiring decisions and remedial actions; propose any mid-course corrections and/or adjustments to the implementation strategy as necessary; and highlight technical achievements and lessons learned derived from project design, implementation and management.

An independent final evaluation will be carried out three months prior to the terminal review meeting of the project partners. The final evaluation would aim to identify the project impacts and the sustainability of project results and the degree of achievement of long-term results. This evaluation would also have the purpose of indicating future actions needed to expand on the existing project in subsequent phases, mainstream and up-scale its products and practices, and disseminate information to management authorities responsible for related issues to ensure replication and continuity of the processes initiated by the project.

4.7 COMMUNICATION AND VISIBILITY

Giving high visibility to the project and ensuring effective communications in support of the Project's message it to be addressed through a number of activities that have been incorporated into the Project design. These include: (i) the recruitment of one PMU staff member responsible (inter alia) for communications and knowledge management; (ii) the preparation of documents and communication tools that capture the Project's economic, ecological and social benefits; (iii) two high level national conferences to raise awareness and lobby for participatory SFM, and; (iv) several awareness raising activities. These inputs and activities will be integrated into the Project Work Plan, and, as such, will come out of the Project's technical activities rather than be stand-alone activities.

SECTION 5 – SUSTAINABILITY OF RESULTS

5.1 SOCIAL SUSTAINABILITY

At the national level, the socio economic benefits of the project will be from increased food security and agriculture commercialization, reduced trade deficit and enhanced knowledge on adaptation measures. The goal of agricultural development in Nepal is national food security and commercialization of agriculture for export promotion. Adaptation to the climate change can safeguard the agricultural production from the actual and possible losses due to climate change and related disasters. The protection of agricultural production helps in food security and export promotion of so called high value commodities reducing national dependency on food import and decreasing widening trade deficit. Reduction in the harms for climate related natural disasters can also reduce the costs of rescue, relief and rehabilitation of climate related victims. Reduced risks in agricultural production can also decelerate the rate of emigration of youths and abandonment of farmlands.

The project will generate valuable knowledge on reduction of vulnerability and adaptation to the climate change. The knowledge generated will be helpful to the government for mainstreaming the adaptation to national policies, plans and strategies and planning. The information thus generated will also be useful for the government to provide guidelines for programme planning in agriculture at the district level. The knowledge generated from two hill districts will be useful for the entire hill districts (55) in the country and those generated from the terai districts will be useful for all the terai districts (20). The knowledge gained by the government staff and capacity built will be useful for future decision making in adaptation as well as integrated development projects with a component of climate change adaptation.

At the local level, the adaptation to the climate change improves livelihoods of 3000 vulnerable farmers in 24 VDCs reducing additional burdens of climate change. Adaptation measures not only restore their actual or expected loss in agricultural production due to the climate change, but also slow down the rate of rise in costs of agricultural production due to climate change. The adaptation decreases the risks of failure of agricultural production increasing the confidence among the farmers and insurance companies. This also reduces the premium of the insurance. Reduced vulnerability of farming communities not only improves their household food security, but also improves their social status. As the weaker sections of the society like poor, Dalit, Janajati and female are suffering more from the impacts of climate change, the adaptation also decreases the disparities among the people in the society increasing equity. Knowledge gained by the farmers from this project will go far beyond the project period benefitting them in different ways in future.

Increased access of the farmers to new crop varieties and other production technologies helps farmers increase production, better manage risks from droughts and floods and increase resilience. National Rice Research Program has developed five drought tolerant and two flood tolerant varieties of rice for general cultivation in rainfed low land of the project districts. The production technologies that benefit the farmers by increasing resilience include conservation farming practices that reduce soil erosion, conserve water and increase biodiversity. Micro irrigation systems to be promoted by the project will increase water-use efficiency and help farmers better manage droughts. Livelihood diversification measures will promote less risky crops and livestock decreasing reliance of the farmers on more climate-sensitive agricultural products.

5.2 ENVIRONMENTAL SUSTAINABILITY

The Project is designed to yield environmental benefits. The Project aims to improve health of agricultural production systems and resilience. The Project also aims to contribute directly to sustainable management of agricultural resources. Hence the Project should only have positive impacts on the environment. There is no reason to expect that any of the Project activities should lead to pollution, watershed degradation, the introduction of alien species or any other form of environmental damage. This situation will be monitored using standard FAO procedures and mechanisms.

5.3 SUSTAINABILITY OF CAPACITIES DEVELOPED

The Project builds on a proven approach to develop capacity of farmer groups through FFS. The Government and FAO have been working on FFS for several years, and have developed a full approach to develop this capacity. The Project works with and through the local government structure to develop their capacity to take on the Project challenges after the FAO and GEF funding is completed. Notably, the Project works with the farmer groups at the VDC level. The Government is committed to establishing and equipping these, and in recent years it has developed these, establishing more than twenty. This Project will support these to perform their mandate – that is a *capacity development-by-doing* approach. After this Project, the Farmer Groups will have the technical and organizational skills.

5.4 APPROPRIATENESS OF TECHNOLOGY INTRODUCED

This Project is not technology centred. However, new methods and practices will play an important role in helping the farmers groups to develop. These include agricultural adaptation practices that have already been piloted in Nepal and have been proven to be locally suitable. There is no reason to expect that any of the practices/methods introduced and developed will be inappropriate. This situation will be monitored using standard FAO procedures and mechanisms.

5.5 REPLICABILITY AND SCALING UP

The case studies based on the field level experiences will provide the adaptation benefits and economic value of adaptation practices and its effectiveness in reducing the impacts of climate variability and change. The project component 3 is specifically designed to improve sharing of good practices, lessons and knowledge management. The districts and national level knowledge sharing initiatives provide necessary policy advocacy for integration of good practices and replication in similar areas by provision of additional government funding.

ANNEX I: RESULTS MATRIX

Component 1: Strengthening of technical and institutional capacities and integrating adaptation into national food and agriculture policies, strategies and plans

Results chain	**Indicators**	**Baseline**	**Milestones**				**End of project target**	**Means of verification and responsibility**	**Assumptions**
			Year 1	**Year 2**	**Year 3**	**Year 4**			
Outcome 1.1: Strengthening technical capacity in the Ministry of Agricultural Development (MOAD), Department of Agriculture (DOA), Department of Livestock Services (DLS) and Nepal Agricultural Research Council (NARC) and local stakeholders on climate change adaptation	MOAD, DOA, DLS, NARC and local stakeholders be able to incorporate climate change adaptation priorities into decision making at all levels	Capacity of the government agencies and local stakeholders is inadequate to respond to impacts of climate variability and change in agriculture sector	Training module/manual developed	Capacity developed	Reflected in decision making and response measures	Improvement in institutional and technical capacity sustained within the institutional system	Technical capacity of government institutions and local stakeholders strengthened in climate change adaptation	Government decisions published in the form of reports such as policy report, plans, annual progress and evaluation reports	Trained staffs will get involved in planning, policy and decision making
Output 1.1.1: Capacity development programme implemented at national and district level to enhance technical capacity on climate change adaptation	Number of trainings organized Number of staff trained at national and district levels Number of training manuals developed. Number of regular training with CCA integrated into government regular training programmes	No separate training module available. A few staffs trained on climate change adaptation (1 from MOAD, 3 from DOA, and 3 from NARC). Two short trainings organized as part of FAO pilot project (2008 – 2011) No climate change	1 training module developed and first batch of training for 25 participants organized	Training modules developed and TOT organized for 200 participants in 4 districts Staffs of training centres get included in the training)	Second batch of training of 25 participants organized Training manuals included in regular training activities of the government		2 trainings conducted with 25 participants each at the national level & 8 trainings conducted with 25 participants each at the district level 2 manuals developed and integrated to regular training	Training completion reports Annual reports Training manual Training curricula of training institutes in MOAD/DOA/DLS	NAPA remains the priority of the government Commitment of the government staff to prioritize climate change concerns Training centres be ready to revise their curriculum to mainstream climate change adaptation

Results chain	Indicators	Baseline	Milestones				End of project target	Means of verification and responsibility	Assumptions
			Year 1	Year 2	Year 3	Year 4			
		adaptation training manual available. One class on climate change in general is introduced in DOA/DLS curriculum Other training centre have no specific module in climate change					programs of DOA/DLS		
Outcome 1.2: Climate change adaptation mainstreamed into national agriculture and livestock policies, plans and programmes	Number of policies, plans and programs in agriculture and incorporated with climate change concerns Type and No. of relevant policies and in agriculture and food security with climate elements	Some recent policies, plans and strategies such as climate change policy, approach paper of three year plan and ADS has some mentions of NAPA and climate adaption	Documents for mainstreaming identified	Facilitation and strategy revisions conducted at the national level	Endorsement process initiated	Mainstreamed strategies endorsed	Climate change adaptation mainstreamed into selected national policies, programmes and plans	Publications of the government in hard copies as well as web portal	Existing policy documents are revised giving chance for mainstreaming climate change adaptation during the project implementation phase
Output 1.2.1: Technical capacity and cross-sectoral coordination mechanism strengthened to facilitate integration of climate change adaptation into agricultural plans and programmes	Number of training organized Number of staffs trained A mechanism established/strengthened with guidelines and rules and responsibilities	No such training reported so far. There are some assessments conducted but needs further interventions Climate Change Council and Multi-sectoral Climate Change	Training curricula developed and reviewed Coordination mechanisms established and agreed	Training conducted MOAD leads the coordination within agriculture sector and act as the focal point for climate	-	-	1 training with 25 participants conducted At least one mechanisms identified, developed and facilitated within	Training completion reports Reports of the cross sectoral coordination meetings	The national level implementing partners are willing to make use of the trainings MOAD is willing and capable of coordinating

Results chain	Indicators	Baseline	Milestones				End of project target	Means of verification and responsibility	Assumptions
			Year 1	Year 2	Year 3	Year 4			
		Initiatives, Coordination Committee formed for cross-sectoral coordination. Food Security and Environment Division of MOAD has no specific mechanism available for coordination	with the implementing partners	change related activities in agriculture and food security			MOAD		the climate change activities in agriculture sector
Output 1.2.2: Updated national agriculture strategies and district adaptation/risk reduction plans available with climate change adaptation priorities of NAPA, investment plans and budget (at least 5 strategies/ plans with budget allocation for adaptation actions prepared and endorsed by the Government).	Number of strategies/plans developed and endorsed by the government Type and No. of development frameworks that include specific budgets for adaptation Type and No. of sectoral strategies that include specific budgets for adaptation actions	ADS has incorporated some concerns on CCA. District Disaster Relief Committee (DDRC) Disaster Preparedness and Response Plan (DPRP) and District Disaster Management Plan (DDMP) available in all 4 districts	Strategies and plans identified and reviewed	Strategies and plans revised incorporating adaptation priorities of NAPA based on the advice from the government	Initiate government procedure to endorse the documents	Endorsed by the government	At least 5 strategies/plans updated incorporating climate change adaptation priorities	Publications of the government and other agencies and updated plans	NAPA remains in the government priority

Component 2: Assessment, monitoring and providing advance early warning information on vulnerabilities,risks of climate change and agrometeorological forecasts to assist better adaptation planning

Results chain	Indicators	Baseline	Milestones	End of project	Means of	Assumptions

			Year 1	Year 2	Year 3	Year 4	target	verification and responsibility	
Outcome 2.1 Improved vulnerability and risk assessment tools, FAOs crop situation and yield assessment methods introduced and implemented at the local level	Type and Number of methods introduced and implemented Proportion of farmer groups implementing adequate risk reduction measures, disaggregated by gender Per cent population covered by adequate risk information disaggregated by gender Number of farmers reacting or acting according to early warning system.	No use of vulnerability and risk assessment tools reported. Farmers spontaneously using risk reduction measures such as choice of crop varieties, planting time, irrigation and pesticide applications. But, not based on customized agro-climatic risk information Less than 5% of the target population receive some form of risk information. No early warning system is available to the farmers in the project locations.	Tools and method identified and implementation initiated	Tools and methods implemented at national level (NARC & MOAD)	Sustained communication of early warning and risk information communicated to the vulnerable communities		Tools and methods adopted by the government and vulnerable communities in 24 VDCs receive timely risk information	Publications of district line agencies Discussion with the communities Discussion with the communities and also the progress reports of district line agencies Discussion with communities	Farmers can understand the importance and usefulness of the tools and methods
Output 2.1.1: Improved tools and methods for assessment of climate change risks and vulnerability and crop yield assessment models introduced at the national level and core staff trained (>25 staff at MOAD, DOA, DLS and NARC trained) and linked with at least 4 districts.	Climate Risk Information System for farmers implemented. Number of tools introduced Number of staffs trained Number of farmers accessing early warning information	Participatory Vulnerability Analysis (PVA), Vulnerability and Capacity Assessment (VCA), CRiSTAL (Community-based Risk Screening Tool-Adaptation and Livelihoods), Vulnerability Assessment Framework available, but staff not trained Vulnerability	Tools and methods identified. Training modules and manuals prepared for impact and vulnerability assessment in agriculture	Training on impact assessment and crop yield model and crop forecasting system conducted and relevant system established	The information products are delivered at the district levels for decision making	-	Tools and methods identified and implemented at the national level for impact assessment and crop monitoring and yield forecasting system established	Publications of the government and other agencies Project monitoring and evaluation reports Regular crop assessment reports available	MOAD and NARC both interested in handling the model for crop yield projection based on the climate change scenario at national level Climate change adaptation and Disaster Risk

Results chain	**Indicators**	**Baseline**	**Milestones**				**End of project target**	**Means of verification and responsibility**	**Assumptions**
			Year 1	**Year 2**	**Year 3**	**Year 4**			
		assessment methods and tools not available to guide implementation of suitable adaptation measures					Crop Yield Model provided to for NARC with its application through training and capacity building of NARC and DHM Technical Staffs	Spatial information products on climate risk and vulnerability available	reduction trainers available in National level
Output 2.1.2: Improved risk and vulnerability assessment methods (from output 2.1.1) used to develop spatial risk and impact information on agriculture for 24 Village Development Committees (VDCs) in 4 districts.	Baseline information about agriculture vulnerability at the district level available and weekly data of climate provided DisInventor database used in vulnerability assessment at Village and district levels Data and information collection format standardized The existing practices of vulnerability assessment in disaster risk and climate change improved.	Nepal Disaster Risk Reduction Portal, an online information system on DRR, under MOHA provides all kind of information related to disaster risk management (www.drrportal.gov.np. SAHANA System established for data management under the National Emergency Operation Center (NEOC). Data base related to disaster and agriculture not yet available for systematic management at district level.	EThe spatial information on risk and vulnerability developed Selected staff trained for the use of several data sources and their analysis in agriculture perspective Prepared Data Collection Format specific to Agriculture impacts, production	Reported and disseminated Seasonal basis/monthly basis of information of agriculture impacts and linked with early warning system	Reported and disseminated Seasonal basis/monthly basis of information of agriculture impacts and linked with early warning system	Reported and disseminated Seasonal basis/Monthly basis of information of agriculture impacts and linked with early warning system	Risks and vulnerability assessment tools identified and used at central and local levels. Spatial information on vulnerability and risk available for 4 districts	Publications of the government and other agencies; Project monitoring and evaluation reports Data collection format Vulnerability assessment tool for agriculture perspective	Local level staffs can understand the importance of such tools and methods. Disaster and climate related data base system available at National level that can be used for project districts in coordination with the concerned institutors

Results chain	**Indicators**	**Baseline**	**Milestones**				**End of project target**	**Means of verification and responsibility**	**Assumptions**
			Year 1	**Year 2**	**Year 3**	**Year 4**			
Outcome 2.2: Improved agrometeorological forecast disseminated in 4 districts in close coordination with similar initiatives at the national level	Number of the farmers and farmers' groups using at least one improved agro-meteorological forecast products	Daily weather forecasts is available through radio, but most farmers do not listen and those listen do not get confidence or time for action	Improved agrometeorological forecast products identified	FFS farmers trained to receive and understand the forecast	Use of forecast by the farmers facilitate and monitored	Use of forecast by the farmers facilitated and monitored	Usable forecast information relevant to local context is available in 4 districts	Discussions with the communities Publications of DADO and DLSO	
Output 2.2.1: Improved agrometeorological forecast products from the Department of Hydrology and Metheorology (DHM) planned under the Climate Investment Fund's PPCR project disseminated to 120 farmer groups (at least 3000 men and women farmers) and wider rural communities in 24 VDCs of 4 districts and end-users trained using Farmer Field School (FFS) approach (new products introduced at the local level and sustainable mechanisms to interpret the forecasts established in 4 districts).	Number of improved agro-meteorological products availed from PPCR and disseminated to farmers Number of groups of the farmers have access to improved forecast products Number of FFS with access on early warning information Number of agriculture experts skilled with CMS Number of climatic stations upgraded	The farmers groups in the project areas are not getting climate information/risk information products. DADO Udayapur organized 2 FM program and DADO Siraha organized 28 FM radio programs One day weather forecast from radio is being received, but farmers do not use them for decision making Under PPCR project Weather Research Forecast (WRF) Model for weather forecast for 3 days is being planned and dissemination of early warning system in agriculture and Agro-Advisory System through web-portal and printed form is anticipated.	Improved agrometeorological forecast products identified for early warning for agriculture. Improved 3 Climatic Stations in Udayapur, Kapilbastu and Argakhanchi and developed	The forecast products taken to the FFS. Effective Used AMIS system under PPCR programme in Siraha District Disseminated through Agro-advisory system in 120 FFS	Use of forecast by the farmers monitored and facilitated. Effective used of Agro advisory Disseminated mitigation measures through Agro-advisory system in 120 FFS	Disseminated mitigation measures through Agro-advisory system in 120 FFS. Use of forecast by the farmers facilitated and monitored.	Developed effective mechanism of dissemination of forecast system of DHM in all 120 FFS Trained end users farmers to make them able to use forecasting information Improved climatic stations of 4 districts and linked with 120 FFS Available and reliable forecast tools taken to the farmers.	Publications of the government and other agencies Availability of the Forecasting system at forecasting division of DHM. annual progress report of DHM. Weather web based system available. Adaptations measures available based on the model based crop yield products	Reliable forecast products are available in time. EWS Mechanism and Dissemination of Weather related information in line with Agriculture promotion will be in place through PPCR during the GEF project

Component 3. Improving awareness, knowledge and communication on climate impacts and adaptation

Results chain	**Indicators**	**Baseline#**	**Milestones**				**End of project target**	**Means of verification and responsibility**	**Assumptions**
			Year 1	**Year 2**	**Year 3**	**Year 4**			
Outcome 3.1 Awareness raising, knowledge management and communication strategy drawn, agreed and implementation plan prepared.	Awareness raising, knowledge management and communication strategy formulated Target population awareness of predicted adverse impacts of climate change and appropriate responses, disaggregated by gender (Score) Proportion of population affirming ownership of adaptation processes, disaggregated by gender (% of population)	No such strategy available now No such predicted product is available in the villages No planned adaptation processes was found at the district and village levels	Workshops facilitated and strategy developed	Strategies endorsed at the national level	-	Strategy implemented at all levels	Awareness raising, knowledge management and communication strategy formulated, implemented and monitored	Publications of DADO and DLSO Discussion with the communities	
Output 3.1.1: Comprehensive and multi-stakeholder awareness raising, knowledge management and communication strategy formulated and agreed with the Government and non-	Strategy formulated and number of government agencies agreed To implement	No such strategy is formulated for agriculture sector	Stakeholder awareness raising, knowledge management and communicatio n strategy	Strategy endorsed at the national level			Awareness raising, knowledge management and communication strategy formulated, implemented and	Publications of the government agencies	Government and non-governmental organizations come into a common decision to make use of the

Results chain	**Indicators**	**Baseline#**	**Milestones**				**End of project target**	**Means of verification and responsibility**	**Assumptions**
			Year 1	**Year 2**	**Year 3**	**Year 4**			
governmental organizations at national, district and local levels and applied to fostering implementation of new and currently available adaptation practices outlined in Nepal's NAPA			facilitated				monitored		strategy
Outcome 3.2: Knowledge and awareness on climate change increased and improved adaptation practices and livelihood strategies disseminated for location specific context	Number of climate change adaptation practices adopted Number of farmers adopted improved livelihood strategies	No improved practices are found to match the needs of the climate change impacts	Typology of practices and new knowledge documented and applied	Lessons learned documented	Publications prepared	Published hardcopy and via nets	Knowledge and lessons learned updated, compiled and published for wider replication and upscaling	Discussion with communities and district level line agencies Discussion with farmers and data published by line agencies Published products related to good practices examples	Government and non-government organizations will replicate and upscale the good practices and lessons learned
Output 3.2.1: At least 120 Farmer Field School (FFS) facilitators in 4 districts trained on climate change impacts and adaptation in agriculture as outlined in NAPA.	Number of the FFS facilitators trained Number of FFS implemented	17 IPM FFS TOT trained persons in rice and 1 in vegetables in Kapilbastu. Some FFS facilitators developed in other districts, but numbers are not available	FFS strategy prepared, 24 facilitators trained and 24 FFS initiated in the first season. 96 facilitators trained and 96 FFS started in the second season	120 FFS continued	120 FFS monitored and facilitated	120 FFS monitored and facilitated	120 FFS will adopt climate change adaptation technologies in agriculture	Training reports FFS reports. Annual reports of DADO, DLSO. PPCR progress documents (especially Siraha case)	
Output 3.2.2: At least 120 farmer groups involving a total of over 3000 farmers aware of climate change	Number of farmer groups trained Total number of	Nepal Government follows group approach of	FFS initiated and livelihood strategies identified	FFS are supported to diversify livelihood	Support continued	Support continued	Livelihood of 3000 farm households strengthened	Discussions with communities	No extreme natural calamities to the extent to

Results chain	**Indicators**	**Baseline#**	**Milestones**				**End of project target**	**Means of verification and responsibility**	**Assumptions**
			Year 1	**Year 2**	**Year 3**	**Year 4**			
impacts, adaptation measures and alternative livelihood strategies by implementing Farmer Field Scool (FFS) by trained facilitators in 4 districts of Nepal.	farmers continuously engaged in FFS	agricultural extension. Commodity specific or general groups are also formed by various projects. Awareness among the farmers about climate change issues is very low about these issues					through climate change adaptation		counter the improvement through adaptation
Output 3.2.3: Project-related good-practices (at least 25) elaborated and lessons-learned disseminated via publications, project website and others to facilitate up-scaling and integration into policies and plans by the Government and replication in similar situations by non-government organizations.	Number of good practices elaborated Number of publicationson good practice examples Number of awareness raising activities	Some good practices are identified by FAO-UNDP joint project, but not yet up-scaled. More than 20 good practices are identified and integrated into TECA database of FAO and available widely.	Good practices identified and tested through field demonstrations	Good practices identified and elaborated and lessons learned compiled	The documents revised	Good practices and lessons learned published	Climate change adaptation good-practices (at least 25) elaborated and lessons-learned publissed and disseminated	Publications, web portals	Government and non-government organizations will replicate and upscale the good practices and lessons learned

Precise baseline for the farm level will be developed through baseline survey before the commencement of the project interventions.

Component 4. Prioritizing and implementing local investment by promoting Community Based Adaptation (CBA) to strengthen livelihood strategies and transfer of adaptation technology in targeted areas.

Results chain	Indicators	Baseline#	Milestones				End of project target	Means of verification and responsibility	Assumptions
			Year 1	Year 2	Year 3	Year 4			
Outcome 4.1: Livelihood alternatives and climate-resilient physical measures prioritized and implemented by promoting Community Based Adaptation (CBA) to climate change	Number of climate resilient physical measures adopted by the farmer groups Number of farmers groups adopting climate resilient physical measures Type and No. resilient infrastructure measures introduced Households and communities have more secure access to livelihood assets (Score)	No LAPA developed in the pilot VDCs FAO pilot project implemented adaptation and livelihood measures in 4 districts. Some farmers are having tubewells and irrigation facilities Farmers have land and livestock as livelihood assets, but some lands are highly degraded	24 LAPA developed CBA initiated through FFS	FFS supported through physical measures	FFS supported through physical measures	FFS supported through physical measures	24 LAPAs developed covering all selected VDCs and endorsed by the VDC council	Publications of line agencies Discussions with development workers and line agency staffs Discussion with communities	The VDC council owns the LAPA and the local adaptation practitioners use it as guide for replication
Output 4.1.1: Investment to strengthen livelihood alternatives and small-scale climate- resilient physical measures prioritized through Local Adaptation Plans of Action (LAPAs) by involving the community and farmer groups (at least 24 LAPAs prepared and endorsed).	Number of LAPAs prepared and endorsed Type and No. of adaptation actions prioritized and introduced at the local level Type and No. of risk reduction actions introduced at local level	No LAPA prepared in project districts No planned adaptation action introduced in the area VDC Council approves annual plan, but no adaptation actions integrated	24 LAPA developed	LAPA endorsed Key measures of LAPA related to agriculture implemented in 5 FFS per VDC	Small scale physical supports provided for LAPA implementation in agriculture	Small scale physical Supports continued	24 LAPAs Reports prepared and endorsed. Climate-resilient physical measures prioritized by LAPA and livelihood strenthened	Publications Discussions with line agency staffs Discussions with the farming communities	The VDC council use LAPA as guiding document for adaptation actions
Output 4.1.2: Diversified livelihood strategies and alternate sources of	Household income from alternative sources	The population migrated are	Livelihood strategies	Income generating	Support to income generating	Support to income generating	Livelihood of 3 000 farm households	Discussions with the communities	Women in the villages will be able to adopt

Results chain	Indicators	Baseline#	Milestones				End of project target	Means of verification and responsibility	Assumptions
			Year 1	Year 2	Year 3	Year 4			
income (eg. Off-season vegetable cultivation, multi-purpose tree species, tree-crop alley farming, livestock enterprises etc.,) implemented in 24 Village Development Committees (VDCs) of 4 selected districts.	Sales revenue of farm products	22060 – Udayapur; 45790 – Siraha; 39929 – Argakhanchi; 29792 – Kapilbastu The trends of out migration is very high because of the low household income	identified for each group	activities identified and implemented	activities continued	activities continued	diversified and strengthened		income generating activities in absence of their male counterparts
Output 4.1.3: Small-scale physical measures implemented to conserve and protect livelihood assets at the community level (eg. water conservation and harvesting, management of degraded community resources, bio-engineering for erosion control etc.,) in 24 VDCs of 4 districts	Number and types of small-scale physical measures implemented, by category	The baseline data is provided in foot note[13]	Major livelihood assets that needs immediate protection identified	Small scale physical measures intervened to protect livelihood assets	Improvements monitored and support continued, modified, realigned	Progress monitored and lessons learned compiled	Livelihood assets of 3,000 farm households in 120 groups protected.	Progress reports of DADO and DLSO Discussion with the farming communities	No large investment needs will arise for protection of livelihood assets during the project implementation**.**
4.2. Adaptation technology relevant to agriculture implemented and new stress tolerant varieties introduced to reduce climate risks	Proportion of the farmers adopting transferred adaptation technologies by technology type, disaggregated by gender Yield of major crops	Farmers in the project VDCs have less access to the technologies and crop yields are low[14]	Identification and evaluation of stress tolerant varieties	Establishment and conduct of field demonstrations	Establishment and conduct of field demonstrations	Establishment and conduct of field demonstrations		Publications of district level line agencies Discussions with the staff of regional research centres	

[13] In Udayapur: rice, wheat, maize seeds for 53 ha, secauture/saw 10, power tiller 1, metal seed bin 4; small irrigation 22 in 2011/12; In Siraha: fish fry 550,000, spryer 38, buckets 38, watering can 608, water pump 38, tubewell 38, small irrigation 21, pheromone traps 50 in 2012/13; In Kapilbastu: fish fry 400,000 small irrigation 26, shed improvement 20, In Argakhanchi: plastic tunnels 6, bee hive 10, shed improvement 10, sprayer 120, metal bin 123, tractor 27, pump set 195 thresher 2, beehive 10 (Annual Agriculture Development Program and statistics of respective DADO. In Udayapur: fodder seed 600 kg, fodder saplings 10,000, Siraha fodder seed 2200 kg, In Kapilbastu fodder seeds enough for 114 ha, saplings 50 ha in 2012/13 and In Argakhanchi fodder seed enough for 16 ha and saplings enough for 115 ha, shed improvement 20 (Annual Progress Report of respective DLSO).

[14] Rice yield per ha is 3.75 tons in Udayapur,1.72 tons in Siraha, 2.93 tons in Argakhanchi and 2.89 tons in Kapilbastu. The wheat yield is 3.18 tons, 1.90 tons, 1.87 tons and 2.98 tons respectively. Maize yield is 2.45 tons, 1.80 tons, 2.92 tons and 2.39 tons respectively.

Results chain	Indicators	Baseline#	Milestones				End of project target	Means of verification and responsibility	Assumptions
			Year 1	Year 2	Year 3	Year 4			
	(rice, wheat, maize) Food sufficiency from own production (months in a year) Type and No. of climate resilient agricultural practices introduced to promote food security Number of farmers adopting stress tolerant and high yielding seed varieties and other adaptive technologies	No such practices are introduced, most of the farmers are using local varieties which are adapted to the local situations but give low yield						of NARC Discussions with communities	
Output 4.2.1: Improved agriculture and livestock management technologies (eg. Improved cropping systems, improved seed storage, sloping land agriculture technology, crop and livestock management practices etc.) implemented to reduce climate risks in at least 24 VDCs of 4 selected districts	Type and No. of adaptation technologies transferred Number of technologies adopted.	No specific adaptation technologies are transferred. District line agencies are providing technologies for form and livestock production	Improved technologies identified and implemented through FFS	Adoption of improved technologies continued though FFS	Adoption of the technology monitored and additional technology transferred	Technology adoption monitored and supported	Improved crops and livestock technology adopted for climate change adaptation	Discussion with farming communities Progress reports of DADO and DLSO	
Output 4.2.2: New stress tolerant crop varieties of rice, wheat, maize and fodder (at least 10 varieties) introduced by Nepal Agriculture Research Council (NARC) in 4 districts and tested and validated involving farmer groups using FFS approach.	Number of varieties introduced for each crop. Amount of stress tolerant and high yielding seed and adaptive technologies introduced to farmers. Number of farmers introduced to stress tolerant and high	Most of the farmers are using local varieties of crops. Some farmers are using high yielding varieties but not specifically the stress tolerant	Stress situations identified for each of 120 FFS Stress tolerant varieties identified	Performance of stress tolerant varieties assessed Suitable stress tolerant varieties	Performance of stress tolerant varieties assessed Stress tolerant varieties validated.	Performance of stress tolerant varieties assessed Stress tolerant varieties validated.	Stress areas identified and validated. At least 10 varieties of rice, wheat, maize and fodder adopted in stress tolerant areas.	Discussion with farming communities Progress reports of DADO and DLSO	

Results chain	Indicators	Baseline#	Milestones				End of project target	Means of verification and responsibility	Assumptions
			Year 1	Year 2	Year 3	Year 4			
	yielding seed and adaptive technologies.		for each stress situation Seeds multiplied	identifie d					

Precise baseline for the farm level will be developed through baseline survey before the commencement of the project interventions.

ANNEX II: WORK PLAN (RESULTS BASED)

Output	Activities	Responsible institutions	Year 1				Year 2				Year 3				Year 4			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 1.1.1: Capacity development programme implemented at national and district level to enhance technical capacity on climate change adaptation	Activity 1: Review of completed and ongoing training programmes at the national and district levels and preparation of training needs assessment and agree on list of trainees	MOAD, PMU																
	Activity 2: Training needs assessment and training resources development	MOAD, PMU																
	Activity 3: Preparation of draft training manual based on the needs assessment and review before the training programme	DADO, DLSO, DPU and PMU																
	Activity 4: Conduct of training events in two phases (2 trainings) at the national level	DADO, DLSO, DPU																
	Activity 5: Conduct of training events in two phases (2 x 25 x 2 times) at district level	PMU																
	Activity 6: Consultations to integrate training curriculum into the MOAD's (DOA, DLS, NARC) regular training programmes.	MOAD, PMU, DOA, DLS, NARC																
Output 1.2.1: Technical capacity and cross-sectoral coordination mechanism strengthened to facilitate integration of climate change adaptation into agricultural plans and	Activity 1: Training needs assessment and training resources development	MOAD, PMU																
	Activity 2: Conduct of training events in two phases (2)	PMU																
	Activity 3: Improvement of logistics and technical capacity of the Environment Unit of Ministry of Agricultural Development (MOAD)	MOAD, PMU																
	Activity 4: Establishment of	MOAD,																

Output	Activities	Responsible institutions	Year 1				Year 2				Year 3				Year 4			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	mechanism for information exchange, collaboration and coordination	PMU																
	Activity 5. Monitoring of climate change related activities at the national level	MOAD, PMU																
Output 1.2.2: Updated national agriculture strategies and district adaptation/risk reduction plans available with climate change adaptation priorities of NAPA, investment plans and budget (at least 5 strategies/ plans with budget allocation for adaptation actions prepared and endorsed by the Government).	Activity 1: Review of current policies, strategies and plans to identify the elements that needs integration of climate change related concerns	MOAD, PMU																
	Activity 2: Conduct of consultation workshops and multi-stakeholder dialogue process to support cross-sectoral coordination	MOAD, PMU																
	Activity 3: Support to the technical working group on agriculture and food security towards contribution to the preparation of National Adaptation Plan (NAP) to complement Global NAP support programme	MOAD, PMU																
Output 2.1.1 Improved tools and methods for assessment of climate change risks and vulnerability and crop yield assessment models introduced at the national level and core staff trained (>25 staff at MOAD, DOA, DLS and NARC trained) and linked with at least 4 districts.	Activity 1: Strengthening technical capacity of NARC by provision of training to Junior staff on crop modelling (2 staff trained)	NARC, PMU																
	Activity 2: Establishment of necessary computing systems and data base, model calibration, validation and assessment of impacts of climate change on major crops	NARC, PMU																
	Activity 3: Strengthening capacity through targeted hands on training to staff of Agri-business promotion and Statics Division of MOAD	MOAD, PMU																
	Activity 5: Establishment of crop	MOAD, PMU																

Output	Activities	Responsible institutions	Year 1				Year 2				Year 3				Year 4			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	monitoring and crop yield forecasting facility within MOAD and sustainable operation and maintenance of facility and continuous production of crop assessment bulletins																	
Output 2.1.2 Improved risk and vulnerability assessment methods (from output 2.1.1) used to develop spatial risk and impact information on agriculture for 24 Village Development Committees (VDCs) in 4 districts.	Activity 1: Improvement of database, methods for vulnerability and risk assessment and hotspots of vulnerability in agriculture sector	PMU																
	Activity 2: Training needs assessment, conduct of training programmes, on tools and methods for assessment of vulnerability and risks	DPU, DADO, DLSO																
	Activity 4: Analysis and development of risks and vulnerability maps for four districts and 24 VDCs	DPU, DADO, DLSO																
Output 2.2.1 Improved agrometeorological forecast products from the Department of Hydrology and Metheorology (DHM) planned under the PPCR project disseminated to 120 farmer groups (at least 3000 men and women farmers) and wider rural communities in 24 VDCs of 4 districts and end-users trained using Farmer Field School (FFS) approach (new products introduced at the local level and sustainable mechanisms to interpret the forecasts established in 4 districts).	Activity 1: Acquiring improved agrometeorological forecast products and agro-advisory products from the PPCR project and modify them to suit to the target districts	MOAD, NARC, PMU																
	Activity 2: Assessment of agro-meteorological observatories at the district level (4) and upgradation to cater the needs	DHM, PMU, DPU																
	Activity 3: Train district level government staff and project staff (District Technical Coordinator and VDC Level Mobilisers) on the use of improved agro-meteorological forecast products and agro-advisory products	PMU, DPU, DTT																
	Activity 4: Develop cell phone based SMS products using improved agro-meteorological forecast products	PMU, DPU																

Output	Activities	Responsible institutions	Year 1				Year 2				Year 3				Year 4			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Activity 5: Train 120 farmers groups to interpret and use improved agro-meteorological forecast products and agro-advisory products through the FFS	DPU, farmers' groups																
Output 3.1.1: Comprehensive and multi-stakeholder awareness raising, knowledge management and communication strategy formulated and agreed with the Government and non-governmental organizations at national, district and local levels and applied to fostering implementation of new and currently available adaptation practices outlined in Nepal's NAPA	Activity 1: Formulation of awareness raising, knowledge management and communication strategy	PMU																
	Activity 2: National level consultation workshop with the government agencies and non-government organizations on awareness raising, knowledge management and communication strategy	MOAD, PMU, national experts																
	Activity 3: District level consultation workshops with the government agencies and non-government organizations on awareness raising, knowledge management and communication strategy in 4 districts	DPU, national experts																
	Activity 4: Finalization and adoption of the comprehensive and multi-stakeholder awareness raising, knowledge management and communication strategy	MOAD, PMU, national experts																
Output 3.2.1: At least 120 Farmer Field School (FFS) facilitators in 4 districts trained on climate change impacts and adaptation in agriculture as outlined in NAPA.	Activity 1: Identification of FFS facilitators already trained by FAO pilot project and other programs and selection of 24 of them (from the project VDCs or nearby area)	DADO, DLSO, DPU																
	Activity 2: Preparation of training curricula for the training and refresher training for FFS Facilitators	PMU																
	Activity 3: Refresher training to 24 FFS facilitators	PMU, DPU																

Output	Activities	Responsible institutions	Year 1				Year 2				Year 3				Year 4			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Activity 4: Identification of 96 FFS facilitators (4 from each VDC)	DPU																
	Activity 5: Training of 96 FFS facilitators (1 training each in 4 districts	DPU																
Output 3.2.2: At least 120 farmer groups involving a total of over 3000 farmers aware of climate change impacts, adaptation measures and alternative livelihood strategies by implementing Farmer Field Scool (FFS) by trained facilitators in 4 districts of Nepal.	Activity 1: Identification, reconstitution or formation of one farmers' group of 25 to 30 farmers in each of the 24 VDCs	DPU, DADO, DLSO																
	Activity 2: Adoption/ development of FFS module for climate change adaptation	PMU																
	Activity 3: Implementation of 24 FFS (one each in the 24 VDCs)	DPU																
	Activity 4: Identification, reconstitution or formation of 4 additional farmers' groups, each of 25 to 30 farmers each in the 24 VDCs	DPU, DADO, DLSO																
	Activity 5: Implementation of 96 FFS (4 in each of the 24 VDCs)	DPU																
	Activity 6: Follow ups of the FFS	PMU, DPU																
Output 3.2.3: Project-related good-practices (at least 25) elaborated and lessons-learned disseminated via publications, project website and others to facilitate up-scaling and integration into policies and plans by the Government and replication in similar situations by non-government organizations.	Activity 1: Identification and elaboration of climate adaptation good practices for agriculture (at least 25)	PMU, NARC																
	Activity 2: Documentation of lessons learned from the project	DPU																
	Activity 3: Publication of good practices and lessons learned through MOAD website: www.moad.gov.np	PMU, MOAD																
	Activity 3: Publication of good practices and lessons learned government websites and integrated into global databases	PMU																
Output 4.1.1: Investment to strengthen livelihood alternatives and small-scale climate- resilient physical measures prioritized through Local Adaptation Plans of	Activity 1: Recruitment of LAPA preparation teams, 4 teams (one for 6 VDCs in each district)	PMU																
	Activity 2: Organization of	DPU, LAPA																

Output	Activities	Responsible institutions	Year 1				Year 2				Year 3				Year 4			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Action (LAPAs) by involving the community and farmer groups (at least 24 LAPAs prepared and endorsed).	district level workshop, 4 (1 in each district)	team																
	Activity 3: VDC level workshops, 24 (1 in each VDC)	DPU, LAPA team																
	Activity 4: LAPA preparation and finalization 24 (1 for each VDC)	LAPA team																
	Activity 5: LAPA endorsement workshop at VDC level, 24 (1 in each VDC)	DPU, LAPA team																
	Activity 6: LAPA endorsement workshop at District level, 4 (1 in each district)	DPU, LAPA team																
Output 4.1.2: Diversified livelihood strategies and alternate sources of income (eg. Off-season vegetable cultivation, multi-purpose tree species, tree-crop alley farming, livestock enterprises etc.,) implemented in 24 Village Development Committees (VDCs) of 4 selected districts.	Activity 1: Farmers group level consultation meetings to identify alternative livelihood strategies, 120 farmers groups in 24 VDCs in 4 districts	DPU, DADO, DLSO																
	Activity 2: Develop livelihood strategies based on the options and aspiration of the farmers in the 120 groups.	DPU, Farmers' groups																
	Activity 3: Implementation of income generation training in 120 farmers groups	DPU																
	Activity 4: Support the farmers groups for implementation livelihood strategies (investment support linked to lAPA)	DPU																
Output 4.1.3: Small-scale physical measures implemented to conserve and protect livelihood assets at the community level (eg. water conservation and harvesting, management of degraded community resources, bio-engineering for erosion control etc.,) in 24 VDCs of 4 districts	Activity 1: Transect walk with farmers and field observations by a team of SMS to identify needs for small scale physical measures for each of 120 farmers groups	DPU, DADO, DLSO, NARC																
	Activity 2: Consultation workshop with farmers groups to identify and design location specific small scale physical measures such as water conservation and harvesting, management of degraded community resources, bio-	DPU, Farmers' group, FFS																

Output	Activities	Responsible institutions	Year 1				Year 2				Year 3				Year 4			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	engineering for erosion control etc.,																	
	Activity 3: Designing the small scale physical measures	DPU, FFS																
	Activity 4: Implementation of small scale physical measures in participation with the farmers' groups	DPU, FFS																
	Activity 5: Monitor the success of the physical measures and help the farmers groups to improve them	DPU, FFS																
Output 4.2.1: Improved agriculture and livestock management technologies (eg. Improved cropping systems, improved seed storage, sloping land agriculture technology, crop and livestock management practices etc.) implemented to reduce climate risks in at least 24 VDCs of 4 selected districts	Activity 1: District level consultation workshop to identify and define suitable agriculture and livestock management practices in the project areas, 4 districts	DPU, DADO, DLSO																
	Activity 2: VDC level consultation workshop to identify and define suitable agriculture and livestock management practices in the VDC, 24 VDCs	DPU, DADO, DLSO																
	Activity 3: Need assessment in consultation with FFS farmers, in 120 FFS	DPU, DADO, DLSO																
	Activity 4: Skill training of the farmers in 120 FFS groups	DPU, DADO, DLSO																
	Activity 5: Identification of the technology for demonstration in the farmers groups, 120	DPU, DADO, DLSO																
	Activity 6: Demonstration of technology in 120 groups of the farmers	DPU, DADO, DLSO																
	Activity 7: Farmers visits to the demonstration sites of other groups and other VDCs in the district	DPU, DADO, DLSO																
	Activity 8: Assessment of the success of the demonstrations and compilation of lessons learned	DPU																

Output	Activities	Responsible institutions	Year 1				Year 2				Year 3				Year 4			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 4.2.2: New stress tolerant crop varieties of rice, wheat, maize and fodder (at least 10 varieties) introduced by Nepal Agriculture Research Council (NARC) in 4 districts and tested and validated involving farmer groups using FFS approach.	Activity 1: Assessment and access of foundation/certified seeds of recommended stress tolerant crop varieties (NARC)	NARC, DPU																
	Activity 2: Identification of farmers for demonstration and seed multiplication	NARC, DPU, DADO, DLSO																
	Activity 3: Demonstrations of stress tolerant varieties of crops and fodder though FFS	NARC, DPU, DADO, DLSO																
	Activity 4: Farmers mobile workshop to the varietal demonstrations of other groups and other VDCs in the district	NARC, DPU, DADO, DLSO																
	Activity 5: Assessment of the success of the varieties demonstrated and compilation of lessons learned	NARC, DPU, DADO, DLSO																
	Activity 6: Seed multiplication of suitable stress tolerant varieties and establishment of sustainable mechanisms	NRC, DPU, DADO, DLSO																

ANNEX III: RESULTS BASED BUDGET

Annex IV. Baseline information: Socioeconomic and Livelihood Conditions of Project Districts

Udayapur: Udayapur is a hill district in Eastern Nepal with 66 557 households and 317 523 people. Number of females is much larger than that of males (sex ratio only 89). Nearly 27% of the households have at least one member absent from the household during the population census 2011 and to absentees are 22,060. Out of the absent people, nearly a half (47%) has gone to Middle East countries followed by ASEAN (28%) and India (20%). Most of the people migrated are for private jobs in the destinations. This out migration causes a lower population growth in the district (0.99% per annum) as compared to the national average (1.35%). As the area of the district is 2063 sq. km. the population density is 154 persons/sq. km.

Out of 125,166 working population of age above 10 years in Udayapur district 72% works in agriculture, forestry and fishery. Six percent each works as service and sales workers, and craft and related trades. The proportion of females working in agriculture, forestry and fishery is still higher (80%). Udayapur district has total cropped area of 40,666 ha. Nearly one-third of the cropped area is of rice (30%) and one-fourth maize (23%). Wheat and oilseeds command to 13% of the cropped area each. Over 8% of the cropped area in the district is covered with vegetables. Nearly 6% area is under millet and 5% under pulses. Potato and spices crops are grown in smaller areas. Paddy yield is 3.75 tons/ha and wheat yield is 3.18 tons/ha. Similarly, the yield of maize, millet and buckwheat are 2.45, 1.95 and 1.00 tons/ha, respectively. Likewise, the yields of barley, pulses and oilseeds are 0.85, 0.86 and 0.71 tons per ha, respectively. Potato yield is 11.13 tons/ha. Spices yield is also good in the district with ginger 13.47 tons/ha, turmeric 8.65 tons/ha, garlic 7.88 tons/ha and chili 2.00 tons/ha. Nearly 54 thousand tons of food grain (edible portion) is produced annually in Udayapur. But, the total requirement for the existing population is 66 thousand tons. The district was food deficit by about 12 thousand tons in the year 2012/13. Udayapur has 129 thousand cattle and 103 thousand buffaloes. Goat and poultry are 228 thousand and 597 thousand. The number of pigs is 47 thousand whereas that of sheep is much smaller. Nearly 31 thousand tons of milk and 6 thousand tons of meat are produced annually. Egg production is 8 million in number. Being a hill district, fish production is much small (only 52 tons per annum).

Siraha: Siraha district is a plain area (called Terai) in eastern Nepal with 117,962 households and 637,328 people living in the area of 1,188 sq km. Among the four project districts, Siraha has the largest numbers of households, population and population density (536/sq. km) followed by those in Kapilbastu. This is because of the plain topography and larger areas of farmland to support them. Due to large number of male members (45,790) absent from the household the sex ratio is 95. Over 31% of the households have at least a member absent during the census. Among these absentees 75% are in Middle East countries followed by 15% in ASEAN and 8% in India.

Out of 211,503 working population of above 10 years in Siraha district 60% works in agriculture, forestry and fishery. Over 19% work for elementary occupations (unskilled and manual or blue-collar). Over 6% works as service and sales workers, and 5% in craft and related trades. The proportion of females working in agriculture, forestry and fishery is still higher (66%). Out of 81,024 ha of cropped area in Siraha district, 38% is allocated for rice, 24% for pulses and 19% for wheat. Oilseeds command 8% of the area and maize, potato, sugarcane, and vegetables cover 2% each. Spices crops are very limited. Crop yield is much lower in Siraha district as compared to that in Udayapur. The yield of rice is 1.73 tons/ha, what 1.90 tons/ha and maize 1.80 tons/ha. Among the cash crops, sugarcane yields 46.23 tons, potato 13.00 tons, jute 1.52 tons and tobacco 0.71 tons per ha. Similarly, the yields of ginger turmeric and garlic are 12.00, 4.54 and 6.00 tons per ha, respectively. In Siraha only 47 thousand tons of food grains was produced in 2012/13 which is less than 40% of the total requirement of the district. Thus, the food deficit in the district was 72 thousand tons in the year. Siraha district has 110 thousands of cattle and 105 thousands of buffaloes. Goat and poultry are 185 thousand and 858 thousand, respectively. Nearly 21 thousand pigs and some 2 thousand sheep are also reared in the district. Annual milk production is 35 thousand tons and meat production slightly over 5 thousand tons. Egg (14 million in number) and fish (2 thousand tons) productions are higher in Terai district than in hill districts.

Table 1. Household and population in project districts

District		Udayapur	Siraha	Argakhanchi	Kapilbastu
Topography		Hill	Terai plain	Hill	Terai plain
Number of households		66,557	117,962	46,835	91,321
Population	Total	317,532	637,328	197,632	571,936
	Male	149,712	310,101	86,266	285,599
	Female	167,820	327,227	111,366	286,337
Sex ratio		89.21	94.77	77.46	99.74
Average household size		4.77	5.40	4.22	6.26
Population growth rate (%) (2001 to 2011)		0.99	1.08	-0.53	1.73
Area (sq. km.)		2063	1188	1,193	1,738
Population density		154	536	166	329
Household with absent member (%)		26.68	31.19	53.95	22.97
Absent population		22,060	45,790	39,929	29,792
Major crops (commanding more than 10% cropped area)		Rice, maize, oilseeds and wheat	Rice, pulses and wheat	Maize, rice, wheat,	Rice and wheat
Food production (edible portion only) (tons)		53,933	47,020	63,618	175,743
Food requirement (tons)		66,265	119,303	39,983	106,904
Food balance (tons) (2012/13)		-12,332	-72,283	23,635	68,839
Major livestock		Cattle, buffalo, goat and pig	Cattle, buffalo, goat and pig	Buffalo, cattle and goat	Cattle, buffalo, goat and sheep
Milk production (tons)		30,700	35,297	25,256	26,981
Meat production (tons)		5,879	5,421	3,808	5,214
Fish production (tons)		52.5	2,171	4.5	1,151
Number of VDCs		44	106	42	77
Number of Municipalities		1	2	0	1

Sources: Author's compilation from CBS 2011 National Population and Housing Census 2011 (National Report), Volume 01, NPHC 2011, Central Bureau of Statistics, Kathmandu. MOAD 2013 Statistical Information on Nepalese Agriculture 2012/2013 (2069/070), Ministry of Agricultural Development, Kathmandu

Argakhanchi: Argakhanchi is a hill district in Western Nepal with 46,835 households and 197,632 people. As the economic opportunities are very limited in the district nearly 40 thousand people are absent from the households leading to a skewed sex ratio of 77. Among the four project districts, the sex ratio is the lowest in Argakhanchi and the highest in Kapilvatu. Nearly 54% of the households have at least one member absent from the households. Over 71% of the absentees are in India followed by 20% in Middle East countries. Population growth rate during the last decade was negative and population density is 166/sq km. This is because of the absent population during the census. Persons away or absent from birth place or usual place during census for employment or study or business purpose is considered absent population and thus, not counted in the population.

Out of 84,732 working people above 10 years in Argakhanchi district 73% work in agriculture, forestry and fishery. Nearly 7% works in craft and related trades and 5% as service and sales workers. The proportion of females working in agriculture, forestry and fishery is much higher (83%) than the males (60%). Argakhanchi district has total cropped area of 39,067 ha. Maize is the major crop

covering 43% of the cropped area followed by paddy (22%) and wheat (19%). Over 3% area is covered by oilseeds, pulses and vegetables each. Spices crops like ginger, turmeric, garlic and chili are grown, but in small scale. Maize yield is much better (2.92 tons/ha) in Argakhanchi district than in other project districts. In this district rice and wheat yields are 2.93 and 1.87 tons/ha, respectively. Millet and barley each yields 1.20 tons/ha. Among the cash crops, sugarcane yield is 36.67 tons and potato 8.00 tons. Among the spices crops, ginger yield is 11.19 tons/ha, turmeric 6.00 tons/ha, garlic 4.11 tons/ha and chili 6.26 tons per ha. Nearly 64 thousand tons of food grain was produced in Argakhanchi in the year 2012/13 and total requirement was much lower (40 thousand tons). Thus, the district is food surplus by about 24 thousand tons. Cattle number (50 thousand) is much smaller in Argakhanchi district as compared to buffaloes (100 thousand). The district has 87 thousand goats and 285 thousand poultry. Pigs are much smaller in numbers in western part of the country than in the Eastern part. Milk production is 25 thousand tons and meat 4 thousand tons per annum. Egg and fish production are much smaller in Argakhanchi as compared to other project districts.

Kapilbastu: Kapilbastu is a Terai district in Western Nepal with 91,321 households and 571,936 people. Gender is balanced in the district but the household size is the highest (6.26) among the project districts. The area of the district is 1,738 sq. km. leading to a population density of 329 persons per sq. km. Nearly 30 thousand people are found to be absent from the households and 23% households have at least one member absent. Among the absentees 43% are in India closely followed by Middle East countries (42%) and 10% in ASEAN countries.

Out of 195,022 working people above 10 years in Kapilbastu district 64% work in agriculture, forestry and fishery. Over 14% of them work for elementary occupations and 6% each in sales and service, and craft and related trades. The proportion of females working in agriculture, forestry and fishery is much higher (73%) than the males (60%). Kapilbastu district has much larger (127,455 ha) cropped area than the other project districts. The largest proportion of this area (56%) is allocated for rice followed by wheat (21%). Pulses are grown in 8% of the area and sugarcane in 4% area. Vegetables cover nearly 4% of the cropped area in the district. In Kapilbastu district, rice yield is 2.89 tons, wheat 2.98 tons and maize 2.39 tons per ha. Sugarcane yield is highest (60.23 tons/ha) in this district among the four project districts. Potato yield is 9.96 tons/ha. The largest surplus of food grain among the project district is found in Kapilbastu district. The total production is 176 thousand tons whereas the total requirement is 107 thousand tons. Thus the surplus for the year 2012/13 was nearly 69 thousand tons. Among the project districts, the largest number of cattle (134 thousand) and sheep (10 thousand) are found in Kapilbastu district. Buffalo is about 100 thousand. Goats are 185 thousand and poultry 637 thousand. Number of pigs is much small (5 thousand). Milk production is 27 thousand tons and meat production 5 thousand tons per annum.

The project districts have varied level of climate change vulnerability (Table 2). Drought is the most pervasive problem affecting large number of people. Drought vulnerability is very high in Siraha district and moderate in other three districts. Similarly, flood vulnerability is high in Siraha, low in Kapilbastu and very low in rest two districts. GLOF Vulnerability is moderate in Udayapur but very low in other districts. As the hill districts are prone to landslides, landslide vulnerability is very high in Udayapur and moderate in Argakhanchi.

Table 2. Climate change vulnerability of project districts

	Index	Udayapur	Siraha	Argakhanchi	Kapilbastu
1	GLOF Vulnerability index	Moderate	Very low	Very low	Very low
2	Drought vulnerability index	Moderate	Very high	Moderate	Moderate
3	Flood vulnerability index	Very low	High	Very low	Low
4	Landslide vulnerability index	Very high	Very low	Moderate	Very low
5	District vulnerability ranking	Very high	High	Low	Low

Source: Ministry of Environment 2010 NAPA to Climate Change

The main occupation in the project districts is agriculture. Forestry and fisheries are complementary areas with agriculture at limited scale. More than two-thirds of the active labour force in the districts is engaged as agriculture, forestry and fishery workers. In each of the project districts, more proportions of women are involved in agriculture than men. For example, 82% of women in Argakhanchi and 80% in Udayapur are working in agriculture, forestry and fishery. Very few people are engaged in other occupations. The project districts in the Eastern region are more prone to food insecurity than those in the western regions. The agriculture is highly vulnerable to the climate change, but the vulnerability differs from district to district. Within a district, the vulnerability and possible adaptation measures differs from VDC to VDC.

VDC level Baseline information: Socioeconomic and Livelihood Conditions

VDCs Selected from Udayapur

Tapeswori: Tapeswori is a large VDC with 2,206 households and 10,152 people in the Eastern part of Udayapur district (Table 3). Nearly a half of the population (46%) is Janajati and about 9% Dalits. Among the Janajati mostly are Chaudhury. Nearly 35% of the households have at least one absent person and hence the sex ratio is 82%. Major crops grown are rice, wheat, maize and potato. Major animals are cattle, buffalo and goat. Gidari irrigation project is under construction through Second Irrigation Sector Project. The VDC is affected by Saptakosi dam. Though the land is fertile and irrigation is available to some extent though SWT, flooding and riverbank cutting by Koshi Bhangala, Bagah, Bhalmati and Gideri rivers are the major problems in farming.

Sundarpur: Sundarpur is also in the eastern part of the district with 1,261 households and 5,673 people. More than one-fifth of the households have absent population and sex ratio is 83%. Most of the people (64%) are Janajati and most of them are Tharu. Nearly 11% is Dalit and 3 % Muslim. The major crops grown are maize, rice, wheat, potato and groundnuts. Some farmers also grow vegetables, mushroom and poultry. Major livestock are cattle, buffalo and goat. This VDC is one of the pocket areas of cattle, buffaloes and fodder production in the district. Some farmers collect NTFP and some other produce handicraft from bamboo. The nearest market is in Fattepur in Saptari District about 5 km from the village and linked with a dirt road. Mango is suffering from insects and pineapple from drought. Dhunga khola irrigation project is under construction for ward No. 1, 2 and 3. The VDC is highly affected by flood of Sibai khola and Dwar khola, siltation of the farmland and desertification. Large chunk (about 2,700 ha) of the once the farmland is now covered with silt making useless for farming. Settlements affected by the flood and landslides are resettled to public land in upland areas that also increases the erosion. The VDC is also vulnerable to riverbank cutting and flood from Dhir khola, landslides, cold waves and wild elephants. The VDC has developed a Local Disaster Risk Management Plan. President Chure Conservation project is implemented in the area. As per the local farmers, the project has helped them to install some tube wells and maintenance of water canals. The VDC has got some supports DADO for shed improvement and biogas installation. CARE Nepal has supported in vegetable farming, riverbed farming and a collection center. A few farmers attempted riverbed farming but success is limited.

Rauta: Rauta VDC is at the center of the district with 1,535 households and 7,630 people. One-fourth of the households are having absent population and the sex ratio is 92%. Rauta is a Janajati dominated village. Over 76% of the population is Janajati mainly Magar, and 11% Dalit. The major crops are maize and wheat with limited rice. Vegetable production is also going on under non-conventional irrigation support of Division Irrigation Office. Among the livestock goat farming is the major one. This VDC is a fodder production pocket of DLSO. Citrus fruits are grown in limited scale. The VDC is vulnerable to flood and landslides. River bank cutting is done by upper Triyuga river and Rasuwa khola. Gully erosion is also a problem. FFS was organized by FAO in early rice and cabbage in 2010.

Aptar: Aptar is a small VDC in Northern part of the district with 862 households and 4,494 population. Nearly 23% households have at least one absent person and sex ratio is 94%. Two-thirds of the people in the VDC is Janajati mainly Rai. Some 6% is Dalit. Hill goats and orange are major

source of cash. Maize and rice are the major staple crops. Rasuwa-Ranibas and Bhaisegoda irrigation projects are to cover ward number 8 and 9. Pigs and poultry are also grown for some consumption. The VDC is vulnerable to riverbank cutting by Rasuwa khola and Odare Sunkoshi khola, landslides and gully erosion. It is also vulnerable to drought.

Hardeni: Hardeni VDC with 706 households and 3,457 population is at the Western border of the district. One-fifth of the households have absent population and the sex ratio is 94%. Over 12% of the population is Dalit and 21% Janajati. Turmeric and chilli are the major marketed surplus from agriculture. Other crops grown are maize and rice. No irrigation project is in this VDC. The VDC is vulnerable to riverbank cutting by Kukur khola and Bahadur khola. Landslides and gully erosion are other problems faced by the farmers.

Katari: Katari is a much larger VDC than others with 4,178 households and 19,284 population. Nearly one-third (29%) of the people is absent from the household and sex ratio is 90. The major crops grown are maize, rice and vegetables and the major animals are goats, pigs, cattle and buffaloes. DLSO has declared this VDC as a pocket area for goat, pig, poultry, cattle and buffalo. Tawa khola Baliya irrigation project is under construction. The VDC is vulnerable to floods and riverbank cutting by Muksar khola, and lower and upper Tawa khola. Other problems are landslides and gully erosion.

VDCs Selected from Siraha

Bastipur: Bastipur VBC in northern part of the district is having 1,158 households and 6,361 population. The sex ratio is 97 and family size 5.49. Small number of people (295) are absent during the census. This is Dalit dominated VDC with 34% of Dalit population. Janajati population is only 4%. The area is drought. This VDC is highly suffering from drought. Major crops grown are rice and wheat. Major source of agricultural income is from mango fruit. Mango is also suffering from drought. Farmers report that mango fruit drops in early stage due to drought.

Gadha: Gadha VDC is inhabited by 878 households and 4,788 people. Family size is 5.45 and sex ratio is 92. Nearly 16% of the population belongs to Dalit and 10% Janajati. Muslims are very few (2%). Major crops grown are rice, wheat, vegetable and potato. Some 50 households grow sugarcane and use for local crushing and molasses making. Mango fruit is a major source of income for the villagers. Among the animals buffaloes and poultry are popular. A Dalit community Dom with 40 households raises pigs. Another source of income, particularly for Dalits is bamboo handicraft. The major problem with the rice crop is drought. The major source of water is shallow tube wells (STW). But, water table is decreasing over the years. Balam River cuts farmland, pasturelands and community forest. Flooding is also a problem in some years.

Harakatti: Harakatti is a small VDC at the Southern part of the district bordering with India with 570 households and 3,055 people. Sex ratio is 94. The VDC has large number of Dalits (27% of population) and 11% Janajati. Major crops grown are rice, wheat, potato and mango trees. The major livestock is buffalo. The farmers in the VDC are suffering from drought. Even mango production is suffering from drought. The VDC is highly vulnerable to floods.

Kushalaxminiya: Kushalaxminiya VDC is situated in Southern lowland in the district with 669 households and 3,770 people. The sex ratio is 95. Nearly 11% of the people are Dalit, 10% Janajati and 8% Muslim. Rice and wheat are the major crops and buffalo the major livestock. Farmers in this VDC are suffering from flood during the rainy season and drought in dry season. The VDC being in border areas with India the people are backward. Elite capture is the major problem in project interventions in the area.

Ramnagar-Mirchaiya: Ramnagar-Mirchaiya is a highly populated VDC in the northern part of the district with 2,580 households and 13,477 population. The sex ratio is 102. Though the VDC falls on the East-West highway, rate of poverty is very high. Nearly 24% of the population is Dalit, 7% Janajati and 5% Muslims. Suffering from drought, but has no preparedness. Due to low productivity of

rice and wheat large number of people depends on daily wage for the livelihood. Vegetable is grown in limited scale. The major livestock are buffalo and poultry.

Chatari: Chatari is a small VDC in the western part of the district at the bank of Kamala river. The VDC has 485 households and 2,711 people. Nearly 67% of the households have at least one person absent during 2011 census and sex ratio is only 79%. It means the village farmers are mainly female. The main crops grown are rice and wheat and main livestock is buffalo. The VDC is highly vulnerable to floods during rainy season and also suffers from drought in winter and spring.

VDCs Selected from Argakhanchi

Patauti: Patauti VDC with 746 households and 3147 people is in upland area of the district. This area is affected by drought and soil erosion. Nearly 60% of the households have at least one absent person. As the sex ratio is only 71 the area is dominated by female population. Nearly 16% of the population is Dalit and 18% is Janajati. Most of the areas are dry lands with limited food production, particularly maize and millet. The major marketed products are vegetables, ginger and dairy products. The market of this VDC is the neighboring district Palpa. The farmers are highly vulnerable to droughts.

Argha: Argha VDC is also a dry upland with 1318 households and 5315 population. This is also a dry area with high risks of soil erosion during flash flood. Due to heavy out migration of males, the sex ratio is only 75%. Nearly 24% of the population is Dalits and 7% Janajati. The staple crops are maize and millet in upper part of the VDC and maize and rice in lower parts. A few marketed products are vegetables, local poultry and goats. The major market is the district-headquarter Sandhikharka. Dhuladhunga irrigation project being implemented by IWRMP will irrigate Ward No 7 of the VDC. The VDC is highly vulnerable to droughts and soil erosion.

Bhagawati: Bhagawati VDC with 962 and 3,858 people is having over 12% of the people is Dalit and 15% Janajati. The farmlands are mostly bari (non-irrigated upland). Due to heavy out migration of males, the sex ratio is only 72%. The major staple is maize and limited rice. It is a vegetable production area that supplies the vegetables to Sandhikharka. Other products with marketable surplus are goats and dairy. Major market of this VDC is in Gulmi district. Drought and soil erosion are the major problems of the area.

Narapani: Narapani VDC is inhabited by 896 and 3,636 people. Nearly 18% of the population is Dalit and 25% Janajati. The sex ratio is 76%. Major marketed surplus of the VDC are vegetables (mainly from ward number 5 and 6), herbs, dairy products, pigs and local poultry. The major market is Sandhikharka. People in Wards No 8 and 9 are far from the road head and are backward. Farmers in the VDC report that summer potato mixed cropped with maize was the main source of income earlier, but now that crop is not performing well. This is because maize sowing is delayed due to delay in onset of monsoon and by that time potato gets sprouted. The potato sprouts are damaged while sowing maize. It is also reported that soybean production and its root nodulation both are decreased. Among the fruits, only plus is marketed that too in limited scale. Only about 5% of the households produce enough food for year round consumption. NEAT is implementing a vegetable production program in the VDC. Most of the farmlands have high degree of slope and prone to soil erosion. The area is also affected by drought. Farmers report that unavailability of irrigation water is the major problem for increasing farm production. In some years, hailstorms occur particularly during May. More rainfall is experienced in Asare Lekhe, Mashina Lekh and Jhandigade falling in ward No 9.

Jaluke: Jaluke VDC inhabited by 1,242 households and 6,142 population falls under low lying areas of Argakhanchi district. This VDC is dominated by Janajati and one of the least intervened areas of the district. Over 16% of the population is Dalit and 66% are Janajati. Most part of the VDC is affected by drought and some parts by flood. The major agricultural commodities grown are rice, maize, banana, turmeric, goat and pig. The area falls under the command area of Lahape-Satmara irrigation project. But, the irrigation project is washed away by flash flood and the people are unable to repair. The farmland has high potential of traditional crops.

Simalpani: The VDC has 1,284 households and 6,110 people. Due to small number of outmigration, the sex ratio is much better (90%). More than a half of the people in this VDC are Dalits (10%) and Janajati (40%). The staple crops are rice and maize. The major sources of cash from agriculture are vegetable farming and goats and poultry rearing. The farmlands are mostly rainfed. Three irrigation projects are completed. Pawatar irrigation project is in Ward No 7 Bairiya North, Vikram Sota irrigation project in Ward No 4 Bairiya North and Khormor irrigation project in Ward No 1 Saljhundi North. However, the water source of the Vikram Sota irrigation project is damaged due to flood. Simalpani VDC is also a low lying area of the district affected by flood during rainy season and drought in other seasons. Landslides and land degradations are other major problems affecting livelihoods.

VDCs Selected from Kapilbastu

Sihokhore: Sihokhore VDC is inhabited by 804 households with 5,681 people. Absent population is very small (161) and sex ratio is 101. Household size is over 7 persons per household. This is because 37% of the population is Muslim followed by 18% Dalit and 2% Janajati. As the people are less educated, poor and backward they have very low adaptive capacity. Juddhaban irrigation project covers small part of the VDC. The major crops grown are rice during the rainy season and wheat during winter. Major animals are buffalo, cattle and village poultry. People are vulnerable from drought, flood and riverbank cutting is severe by river Banganga.

Gugauli: Gugauli is a much bigger VDC with 1,614 households and 10,905 people. Sex ratio is much higher (104) and family size is nearly seven. Nearly a half of the population is Janajati (48%). Some 20% are Dalits and 9% Muslims. The location is remote and communities are backward. They mainly grow rice during the rainy season and wheat in winter. Major animals are buffalo, cattle and village poultry. People are vulnerable to drought, river cutting and flood. Deforestation and squatter communities are also the cause of higher vulnerability.

Mahendrakot: Mahendrakot VDC has 1,548 households and 7,479 population. As some people (788) are absent from the household sex ratio is only 87 and family size is less than 5. Over 13% of the people are Dalit and 41% Janajati particularly Tharu. Mahendrakot irrigation project was constructed in 2004 under Nepal Irrigation Sector Project of the World Bank. The major crops grown are rice and wheat and the major animal is goat. This is mainly resettled area and communities are vulnerable to river cutting both sides of the river.

Hathihawa: Hathihawa VDC is located near Nepal India border with 1,097 and 8,656 population. Family size (7.89) and sex ratio (112) are surprisingly high. The community is mixed with 21% Dalits, 4% Janajati and 23% Muslims. The area is remote and communities are backward. The main crops are rice and wheat. Nearly 50% of the households produce enough food for home consumption. A few farmers particularly Kewat community in Wards No 8, 4 and 3 grow vegetables and some are having mango orchard. Buffaloes and cattle are reared with some goats as well. Stray animals are the major problem for winter crops. The VDC has public pond, but no fish farming. The people are vulnerable to drought, flood and river cutting. Farmers report that water is insufficient during rice planting season and flooding occurs along the side of Kothi river bordering the district Rupandehi.

Bhagwanpur: Bhagwanpur VDC has 785 households and 5,889 population. Male population is much larger than female population with sex ration 113. The family size is much bigger (7.50) than the national average. The level of nutrition is very low. Over 22% of the people are Dalit and 14% Muslim. Absent population is very small. Rice and wheat are the major crops and buffalo is the major livestock. The people are vulnerable to drought and flood. People are poor and highly backward.

Chanai: ChanaiVDC is inhabited by 1,951 households and 11,658 people. Sex ratio is almost balanced (101%). Nearly one-third (30%) of the people are Muslim. Nearly 15% are Dalit and 13% Janajati. The farming communities are vulnerable to drought as most of the farmlands are rainfed. The

communities are backward. The main crops grown are paddy and wheat. The livestock reared are goats and buffaloes.

Table 3: VDC level baseline information

	District/VDC	House-hold	Population	Sex ratio	Absent population	Ethnic groups with >10% population	Livelihood	Climate hazards
	Udayapur	66,557	317,532	89.21	22,060			
1	Tapeswori	2,206	10,152	82.39	963	Janajati, other	Rice, wheat, maize, potato, cattle	Flood, riverbank cutting
2	Sundarpur	1,261	5,673	83.12	339	Janajati, other, Dalit	Maize, rice, wheat, potato, groundnuts, vegetables, cattle, buffalo goat	Flood, riverbank cutting, landslide, cold waves
3	Rauta	1,535	7,630	91.95	449	Janajati, other, Dalit	Maize, wheat, goat	Flood, landslides, riverbank cutting, gully erosion
4	Aptar	862	4,494	89.14	249	Janajati, other	Maize, rice goat, orange, pig, poultry	Riverbank cutting, landslides, gully erosion, drought
5	Hardeni	706	3,457	93.56	160	Other, Janajati, Dalit	Turmeric, chilli, maize, rice	Riverbank cutting, landslide, gully erosion
6	Katari	4,178	19,284	89.90	1,565	Janajati, other, Dalit	Maize, rice, vegetables, cattle, buffalo	Flood, riverbank cutting, landslides, gully erosion
	Siraha	117,962	637,328	94.77	45,790			
7	Bastipur	1,158	6,361	96.75	295	Other, Dalit	Rice, wheat, buffalo, mango	Drought
8	Gadha	878	4,788	91.52	281	Other, Dalit	Rice, wheat, vegetable, potato, sugarcane, mango, buffalo, poultry, pig	Drought, riverbank cutting, flood
9	Harakatti	570	3,055	94.09	225	Other, Dalit, Janajati	Rice, wheat, potato, mango, buffalo	Drought, flood
10	Kushalaxminiya	669	3,770	95.44	207	Other, Dalit	Rice, wheat, buffalo	Flood, drought
11	Ramnagar-Mirchaiya	2,580	13,477	102.39	767	Other, Dalit	Rice, wheat, daily wage, vegetable, buffalo, poultry.	Drought
12	Chatari	485	2,711	79.42	439	Other, Muslim, Dalit, Janajati	Rice, wheat, buffalo	Flood, drought
	Argakhanchi	46,835	197,632	77.46	39,929			
13	Patauti	746	3,147	71.13	829	Other, Janajati, Dalit	Maize, millet, vegetables, ginger, buffalo	Drought
14	Argha	1,318	5,315	74.61	1,099	Other, Dalit	Maize, millet, rice, vegetables, poultry, goats	Drought, soil erosion
15	Bhagawati	962	3,858	72.39	829	Other, Janajati, Dalit	Maize, vegetable, goats, buffalo	Drought, soil erosion
16	Narapani	896	3,636	75.99	633	Other,	Maize, potato,	Drought, soil

	District/VDC	House-hold	Population	Sex ratio	Absent population	Ethnic groups with >10% population	Livelihood	Climate hazards
						Janajati, - Dalit	millet	erosion
17	Jaluke	1,242	6,142	83.34	1,036	Janajati, Other, Dalit	Rice, wheat, maize, banana, turmeric, goat, pig	Drought, flood
18	Simalpani	1,284	6,110	89.87	798	Other, Janajati, Dalit	Rice, maize, vegetable, goat, poultry	Flood, drought, landslides, land degradations
	Kapilbastu	91,321	571,936	99.74	29,792			
19	Sihokhore	804	5,681	100.96	161	Other, Muslim, Dalit	Rice, wheat, buffalo, cattle, poultry	Drought, flood, riverbank cutting
20	Gugauli	1,614	10,905	103.53	308	Janajati, Other, Dalit	Rice, wheat, buffalo, cattle, poultry	Drought, riverbank cutting, flood
21	Mahendrakot	1,548	7,479	87.3	788	Other, Janajati, Dalit	Rice, wheat, goat	Riverbank cutting
22	Hathihawa	1,097	8,656	111.74	208	Other, Muslim, Dalit	Rice, wheat, vegetable, mango, buffalo, cattle	Drought, flood, river cutting.
23	Bhagwanpur	785	5,889	113.14	37	Other, Dalit, Muslim	Rice, wheat, buffalo	Drought, flood
24	Chanai	1,951	11,658	100.62	598	Other, Muslim, Dalit, Janajati	Paddy, wheat, goat, buffalo	Drought

Source: Compiled by Author from population census and field visits.

The VDC level baseline shows that the communities are highly vulnerable to climate change and related disasters as they depend mainly on traditional agriculture for their livelihood. Female are the main sufferers as they have limited mobility from the villages. There is limited information about the adaptation options and related technology. Farmers are well aware about the dry spells and drought, but options available to them to adapt to the situation are very limited. They also have perception that the timing of rainfall has shifted. But, they have little ideas on the adaptation options in agriculture, food security and livelihood options. Similarly, adaptation options are not well identified or prioritized in the planning process of DDCs, VDCs and farm level. Program planners at the districts level have vague ideas of climate change. Some NGOs are found working for climate change adaption, particularly at the central level and their area coverage at the local level is very limited.

Annex V: Farmer Field School (FFS) for Climate Change Adaptation

Farmers Field Schools (FFS) will be implemented in 24 VDCs in 4 districts by adopting learning by doing approach with 120 farmers group. The purpose of the FFS is to engage farmers and improve their adaptive capacity for climate change adaptation. The FFS will be a learning site where farmers and facilitators observe, discuss, experience and document new knowledge for better management in location specific resource endowment and other situations to adapt to the climate change. The farmers will learn and get empowered with knowledge and skills on adaptation to climate change in agriculture. The essential elements of the FFS are presented in Table below.

Table xxx: Essential Elements of FFS

	Elements	Description	Number
1	Farmers group	A group comprises of 20 to 25 farmers who are growing a particular crop of raising a particular animal If suitable existing groups are available, the same will be used, if not, new groups will be formed with a common interest. The theory behind the FFS is that the farmers are experts in conducting their own field studies, but not all the farmers are equally expert. Sharing their experiences benefits each other.	120
2	Farm	Most of the teaching materials come from farms, such as crops growing, animals raised, weather changing, water, soil moisture, disease and pests, soil quality, effects of climate change, benefits from adaptation. All the observations and operations are made in the farm whereas follow up discussions will be made under a tree or shed depending on the season and weather conditions. The farmers groups collect data from their farm, analyze them and make their decisions and share their decisions to other farmers.	120
3	Facilitator	The facilitator, who is trained in FFS and climate change adaption in agriculture, guides the farmers to observe, operate and learn from the farm. He will be competent enough to guide the farmers. S/he will facilitate the farmers in adopting technology or practices for climate adaptation and once the farmers know their role then will be allowed to work themselves.	72
4	Curriculum	As the FFS for climate change adaptation is different than the conventional FFS, a curriculum will be developed for each of the product for this purpose. Though the crops and livestock to be covered will be decided in consultation of particular farmers groups, the FFS for climate change adaptation will cover climate sensitive crops and livestock that are also important for livelihoods of large number of the farmers. Climate change adaption measures in agriculture will be incorporated in crop and livestock production practices. Thus, the adaptation measures are commodity specific. Selected crops and livestock production practices will be modified to adapt to the climate change. The curriculum for each product will follow the natural cycle of the product.	10
5	Project Facilitator	S/he will support facilitators through providing necessary materials and problem solving.	4
6	Financing	The cost commitments for supporting the FFS with logistics and conduct of the field schools are - Honorarium to 72 FFS Facilitators and operational costs of 120 FFS.	USD$ 216 000

Phasing of the FFS: The implementation of FFS in 120 farmers groups will be done in two phases. In the first year 24 FFS facilitators selected from earlier FFS facilitators will be trained with a refreshers training. Each farmers group will get one trained FFS for initiating the FFS. Thus in the first season only 24 FFS will be started, one from each VDC. After a season, 4 better performing farmers will be

identified from each of the 24 FFS and 15 days long training will be provided to them to facilitate the FFS. Then each of these 96 newly trained facilitators will be assigned to a FFS in the VDC. Tentative budget for the implementation of the FFS is presented in the following table.

Table xxx: Implementation and phasing of the FFS

	Description	Year I			Year II			Year III			Year IV
		Sumer	Rainy	Winter	Sumer	Rainy	Winter	Sumer	Rainy	Winter	Sumer
1	Identification of the farmers groups and sites for FFS/CCA	120									
2	Development of FFS curriculum	X									
3	Running FFS (phase I)		24	24	24						
4	Running FFS (phase II)			96	96	96					
5	Backstop on-going farmer run FFS					24	120	120	120	120	120
6	Training of FFS facilitators	24	96								
7	Involvement of FFS facilitator		24	120	120	120	120	120	120	120	120

Table xxx: Tentative budget for FFS

	Description	No	Rate	Budget USD
1	Development/improvement of FFS/CCA curriculum	1	2600	2 600
2	Refresher training for existing FFS, 5 days for 12 persons in 2 districts in the west and 12 persons in 2 districts in the East (food and travel allowances for participants and allowances for resource persons)	2	2500	5 000
3	Training of 96 FFS facilitators selected among the farmers, 15 days 24 participants, training one in each district (food and travel allowances for participants and allowances for resource persons)	4	4 750	19 000
4	Running FFS for a year (Preparatory meeting, seasonal planning, running the FFS for full year (3 seasons), farmers' day and reporting)	120	1400	168 000
5	SMS for special topics (travel and honorarium for 24 VDCs)	24	750	18 000
6	Monitoring DADO/DLSO twice per season each, SMS (2) thrice per season, DADC members once per year.	4	850	3 400
	Total			216 000

Annex VI: Knowledge Management Tools and Methods

Climate change adaptation in agriculture requires targeted diversification of production systems and livelihood strategies and integration of climate change-related issues with market risks and opportunities. This needs enhanced understanding of farmers about changes in risk profiles designing situation specific response strategies. For this, the critical input is knowledge and skill of planners at the central and district levels, extension workers at the service center level and farmers at the village level.

Existing awareness and knowledge management activities: The government has designed strategies and processes to identify, generate, share and transfer knowledge in agricultural sector. The responsibilities of knowledge identification and generation are given to Nepal Agriculture Research Council (NARC) and sharing and transfer are done through the Department of Agriculture (DOA) and Department of Livestock Services (DLS). Knowledge from other sources such as I/NGOs, UN agencies and private parties are supplementary to the effort of the government. The process followed in awareness and knowledge management at national, regional, district and village levels are discussed in following paragraphs.

Awareness and knowledge management activities at the national level: At the national level, the knowledge generation is done by NARC and sharing by training centers under the departments. **NARC** is conducting crop, horticulture, livestock and fisheries research programs. Under NARC, there are two disciplinary institutes—National Agriculture Research Institute (NARI) and National Animal Science Research Institute (NASRI). Cross cutting issues such as communication, publication and documentation, socio economics and agricultural research policy, food research, biotechnology, agri-environment and gene bank are dealt separately.

The Communication, Publication and Documentation Division (CPDD) is responsible for communicating research outputs. The major activities include publication, documentation, audio-visual production and exchange of information with research and development centres. It also publishes proceedings, annual reports, newsletter, booklet, pamphlet, and brochure in hard copy and web portal (www.narc.gov.np). The Division communicates research outputs with Agricultural Information and Communication Center (AICC), Department of Agriculture (DOA), Department of Livestock Services (DLS), I/NGOs and community organizations. Other modes of communicating research findings are meeting, workshop, presentations and publications.

Agricultural Information and Communication Center (AICC) under MOAD produces agricultural information appropriate to farmers, traders, entrepreneurs and professionals. It communicates the information through radio, television, print media, personal phone call, mobile phone and internet. It produces and broadcasts farm radio programs, agricultural news, video documentaries, agricultural programs and television news. It publishes bimonthly agricultural magazine, agricultural diary, calendar, booklet, folder and other print works with messages relating to agricultural technologies. It also collects and documents agricultural information and maintains digital library and website (www.aicc.gov.np).

Directorate of Agricultural Training (DAT) under the Department of Agriculture (DOA) assesses agricultural training needs, designs training and organizes in-service training to technical staffs working under the department. It conducts advanced level training for senior technical officers, subject specific training for technical staffs. It also conducts farmers training for technology dissemination. DAT also works for training programs related to institutional and capacity development, technology and skill improvement. It also organizes week long training in climate change for agriculture for officers in ad hoc basis.

The types of the training provided by DAT include in-service training to officers and village agriculture workers, organic farming training, and WTO and agriculture. The Directorate also provides

technical backstopping to regional training centers and district level organizations in planning, implementing and upgrading the agriculture training programs. To this effect, it publishes agriculture training materials, newsletters, annual progress report, manuals and a journal.

Directorate of Agricultural Extension (DoAE) under DOA is responsible for educating farmers to adopt improved technologies necessary for increasing agricultural production and productivity and enhancing their living standard. Nepal tested several extension models and approaches such as Training and Visit, Block Development, Tuki system and Farming System Research in the past. At present, the major models followed are Farmers' Group Approach, Contracting out and Farmers Field School (FFS).

Livestock Service Training and Extension Directorate (LSTED) under the Department of Livestock Services (DLS) delivers training and extension services to officers, technicians, farmers and entrepreneurs. The subjects covered under the officers trainings include participatory program planning, monitoring and evaluation, participatory rural appraisal (PRA), quality seed production and management, meat inspection, animal breeding and artificial insemination, quarantine management, World Trade Organization and livestock sector, epidemiology and quarantine management trainers training, basic induction training, meat processing, animal disease risk analysis and livestock market management.

The technician level trainings include participatory program planning, monitoring and evaluation, quality seed production and management, trainers training on information program planning and record keeping, social mobilization, livestock market management, PRA, disease diagnosis and laboratory techniques, pasture and livestock feed management, fodder and fodder seed production and livestock breeding and artificial insemination. Similarly, the subject of farmers and entrepreneurs training includes operation of milk chilling vat, village livestock worker, meat processing, veterinary drug retailers and wholesalers, quality milk production, quality meat production, milk processing and product diversifications, commercial livestock and poultry farming, fodder seed production, pasture and feed management, and market management.

Awareness and knowledge management activities at the regional level: Nepal is divided into five development regions and the project districts fall under two development regions-Eastern and Western. Regional Agriculture Training Center (RATC) and Regional Livestock Training Center (RLTC) are operational in each development region. Each RATC organizes 10 to 12 trainings in a year for junior staffs, farmers, private sector and NGOs. It also provides 51 working days Village Agricultural Workers training with objective of covering all the VDCs in the country. Five Regional Livestock Service Training Centers provide training to technicians, farmers and private sector in livestock and poultry production. The regional training centers also provides technical supports to the district level agencies in training need assessment, curriculum and training module development, coordination and monitoring.

Awareness and knowledge management activities at the district level: At the district level, DADO, DLSO and some NGOs are working in agricultural related knowledge management. DADO organizes result and process demonstrations. It also organize production demonstration, package demonstration, IPM FFS, location specific training, off the location training, and farmers tours. Similarly, DLSO provides training to farmers for livestock production and treatment. It also organizes fodder production demonstration. Both of these agencies publish annual progress reports. Some NGOs working in agricultural sectors mobilize communities, empower the communities through information and also transfer technology to their project areas. Local level FMs and newspapers are emerging which can also be used for dissemination of agriculture technologies.

Awareness and knowledge management activities at the village level: The awareness and knowledge management at the village level is mostly done by agricultural and livestock service centers. One such service center has to provide services to 3 to 12 VDCs in the cluster. Two to three junior technicians are posted in each service center. The centers provide services to the farmers on

demand basis. In such case the needy farmers have to approach to the service center to receive the service. The service centers also provide field level trainings and advisory services to farmers in groups. Farmers groups are formed by the service centers, some other projects and NGOs for their own purpose. As many of such groups of the farmers formed earlier are inactive but not formally dissolved, list of exact number of active farmers groups are generally not available. Many of the farmers groups thus formed are still active. Thus, the awareness and knowledge moves from the district level office to service centers and then ultimately to the farmers groups. Those farmers who are not in the group are not getting much awareness about the agricultural technologies.

Table : Designated agriculture and livestock service centers of the selected VDCs

	District/VDC	Agriculture Service Center	Livestock Service Center
	Udayapur		
1	Tapeswori	Rampur	Rampur
2	Sundarpur	Beltar	Hadiya
3	Rauta	Murkuchi	Bhuttar
4	Aptar	Pokhari	Pokhari
5	Hardeni	Katari	Gizidchaur
6	Katari	Katari	Katari
	Siraha		
7	Bastipur	Lahan	Govindapur
8	Gadha	Lahan	Lahan
9	Harakatti	Sukhipur	Sukhipur
10	Kushalaxminiya	Sukhipur	Bayarpatti
11	Ramnagar-Mirchaiya		Mirchaiya
12	Chatari	Kalyanpur	Kalyanpur
	Argakhanchi		
13	Patauti	Maidan	Pokharathok
14	Argha	Bangla	Sandhikharka
15	Bhagawati	Kerunga	Arghatosh
16	Narapani	Dhikura	Narapani
17	Jaluke	Thada	Jukena
18	Simalpani	Thada	Thada
	Kapilbastu		
19	Sihokhore	Gotihawa	Suthouli
20	Gugauli	Ganeshpur	Ganeshpur
21	Mahendrakot	Buddi	Buddi
22	Hathihawa	Pakadi	Pipara
23	Bhagwanpur	Ganeshpur	Ganeshpur
24	Chanai	Bahadurganja	Thunhiya

Source: Author compiled from respective district offices.

Analysis of existing awareness and knowledge management activities in Nepal shows that the country has a good network of agricultural research, training and extension networks. But, it is yet to be tuned for the adaptation to the climate change in agriculture sector. Large efforts are necessary for providing training on climate change adaption to farmers, village level technicians, district level technicians and planners, and central level planers and policy makers.

Procedures and methods for awareness raising and dissemination of adaptation practices: NARC has developed varieties and technologies suitable for water stress conditions. It will identify more technologies and create agriculture related knowledge suitable for climate change adaptation based on information obtained from DHM, DOA, DLS and PPCR project and its own research. It will store the knowledge thus generated in web portal and printed matters such as package of practices, technical guidelines, crop calendar, animal production guidelines and agro-advisory

bulletin. The information will be shared to the departments (DOA and DLS), training centers, regional directorates, district offices (DADO and DLSO) and service centers. The knowledge thus will be transferred to the project VDC and the target farmers organized in FFS will ultimately apply the knowledge.

The project targets the most climatically vulnerable and food insecure 24 VDCs from four project districts in Nepal. The project will analyse adaptation planning process at VDC and district levels and deliver information and knowledge to selected farmers' groups in the project VDCs. Training needs and gaps on existing institutions will also be assessed working with different training and extension providing organizations at the centre and district levels. On the basis of needs and gaps training modules will be prepared for climate change adaption in crops and livestock at the center, district and village levels. Some prioritized training modules will be pilot tested. Pre- and post-training test evaluation will be conducted using the same questions. For involving related stakeholders in decision making workshops will be organized at district and central levels. The outputs of the workshop will help in identifying skill and knowledge requirements of public and private sector agencies, trainers and farmers.

For empowering farmers with knowledge and skills in observing and identification of climate effects and climate change adaption Farmers' Field School (FFS) will be organized. In the FFS the participating farmers can argue with trainers, observe the changes in the farms and experience on adaptation practices. Though the curriculum for the FSS follows the natural cycle of crop and livestock production, some modules for conceptual clarity will also be added before or during the Field School.

Curriculum for conceptual clarity in farmers' field school

i. Determinants of agricultural production
ii. Concept and types of climate change vulnerabilities
iii. Impacts of climate change on agricultural sector
iv. Meteorology and weather forecasting for agriculture
v. Water resource management under climate change
vi. Suitable cropping pattern and appropriate cultivation techniques
vii. Suitable crop varieties for flood and drought prone areas
viii. Suitable livestock breeds and their management for climate change adaptation
ix. Community seed bed preparation techniques for flood and drought prone areas
x. Livelihood adaptation to climate change in agriculture
xi. Gender discrimination in climate change shocks
xii. Disaster management in agriculture sector

Training courses for staff at the district and national levels

i. Determinants of agricultural production
ii. Concept and types of climate change vulnerabilities
iii. Impacts of climate change on agricultural sector
iv. Meteorology and weather forecasting for agriculture
v. Water resource management under climate change
vi. Suitable cropping pattern and appropriate cultivation techniques
vii. Suitable crop varieties for flood and drought prone areas
viii. Community seed bed preparation techniques for flood and drought prone areas
ix. Livelihood adaptation to climate change in agriculture
x. Gender discrimination in climate change shocks
xi. Disaster management in agriculture sector
xii. Concept of regulatory framework for climate change adaptation
xiii. Duties and responsibilities of district and national level officials for climate change adaptation
xiv. Mainstreaming climate change adaptation to national policies, plans and strategies.

The project will also assess institutional capacities to support livelihood diversification through climate change adaptation. The results and impacts of adaptation activities on food security, livelihoods and income of target households will be assessed. The feedback from such assessment of the implementation will be fed to the process of policy making at the center level.

Knowledge management methods and tools: The knowledge management methods and tools are categorized into conventional and IT based. The conventional methods and tools include brainstorming, learning and idea capture, peer assist, learning review, after action review, storytelling, and collaborative physical workspace or FFS. As the climate change adaptation has no a single correct solution, the brainstorming is useful to generate a relatively large number of options or ideas. The brainstorming session can be organized at the national level for policy planning, district and VDC levels for program planning and community level for program planning and implementation of adaption activities.

Learning and idea capture will be helpful in collectively and systematically capturing the learning and ideas that are taking place in the FFS. Group exercises will be conducted for learning and idea capture to enable participants to get a direct experience of personally capturing new learning and ideas on changes taking place and adaptation measures. Similarly, peer assist technique will be used by the project team to solicit assistance from peers and subject matter experts in issues the team may face. Four to six persons with expertise and knowledge in climate change adaptation will be invited to have an in-depth discussion in the issues faced. One FFS facilitator will be developed from each of the selected farmers' group and the facilitator will work with other group members as peer assistant.

Learning review is a technique to aid the farmers' group learning during the work process and help to continuously learn adaptation measures while carrying out the project. It enables both the facilitator and farmers to learn immediately from both successes and failures of the project. Immediately after each day of FFS, the FFS facilitator will initiate the learning review with all the members to understand what was supposed to happen, what actually happened, reasons for gaps if any, and what have actually been learned. After Action Review (AAR) will be used to evaluate and capture lessons learned upon completion of an action. The AAR develops a consensus on what was expected to happen, what actually happened, what went well, reasons for this, what can be improved, how the improvement can be made, and what are the lessons learned. Indigenous knowledge in climate change adaptation can be disseminated through storytelling.

Collaborative physical workspace can be used in the form of FFS. Farmers working in a natural setting in the field interact each other when needed. While working in the field farmers can do some unexpected action or talk something unusual which may lead to generation of new knowledge. Before we start a work in the farm, the farmers should fully understand what the school wants to achieve. Before teaching something new, we should learn how the farmers want to work under the given setting.

The IT based methods and tools suitable for the farmers in Nepalese villages can be village knowledge base (VKB), voice call and SMS. The VKB develops and documents knowledge through creation of new knowledge for climate change and adaptation, expand the knowledge by experiences, discussions and feedback, edit the expanded knowledge into better new knowledge and maintain the knowledgebase. Internet links, voice call, fax, SMS can help in receiving information to the VKB and disseminating to the farmers.

FFS as the Collaborative physical workspace supported by a facilitator and village knowledge base (VKB) will be adopted for climate change adaption in agriculture. The major tools can be printed matters, SMS notice board services, FM channels, agro-call centers and digital display in VKB. Other knowledge management tools like brainstorming, learning and idea capture, peer assist, learning reviews, after action review and storytelling will be applied when necessary.

Annex VII: Monitoring and Evaluation Indicators and their baselines

Monitoring and evaluation: Monitoring and evaluation of adaptation project poses challenge due to wider ramification of the costs and benefits with externalities and spill overs. Monitoring of the project outputs and outcomes will be done regularly throughout the project period. Output indicators and outcome indicators will be used for monitoring. The monitoring measures will be the following:

i. Trimester and annual reports of project implementation using approved format;
ii. Trimester and annual review of the outputs and possible outcomes;
iii. Progress review in district level line agencies and regional level review meeting;
iv. National level progress review;
v. Project Steering Committee meeting in quarterly interval;
vi. Field visits and observations; and
vii. Discussions with the farmers groups.

Impact monitoring indicators: Due to long term nature of impact and many uncertainties in the impacts the adaptation lacks an agreed metric to determine effectiveness (UNFCCC, 2010 as adapted by Sanahuja 2011). As the statistical approach of impact evaluation is not feasible under the given rural setting with dearth of quantitative data and lack of a comparable control group, participatory method will be followed using rapid assessment ex-post impact evaluations. For purpose, the indicators identified will be used. Participatory methods allow the farmers groups to identify changes resulting from the adaptation project. It will also help to look distributional effects through who has benefited and who has not. This method also helps us o identify the strengths and weaknesses of the projects for future intervention, replication and up-scaling.

Table 9: Impact indicators

Project Component	Impact indicator	Baseline	Means of verifications
1. Strengthening of technical and institutional capacities and integrating adaptation into national food and agriculture policies, strategies and plans	Number of national food and agriculture policies, strategies and plans with adaptation integrated.	Some recent policies, plans and strategies such as climate change policy, approach paper of three year plan and ADS has some mentions of adaption	Publications of the government hard copy as well as web sources
2. Assessment monitoring and providing advance early warning information on vulnerabilities, risks of CC and agrometeorological forecasts to assist better adaptation planning	Volume of crop protected from natural calamities. Value of crop protected from natural calamities	Farmers in the project VDCs are loosing some 5 to 10% of the total harvest annually, up to 50% in some years with extreme events	Publications of district line agencies and consultation with the farmers
3. Improving awareness, knowledge and communication on climate impacts and adaptation	Communities will be able to discuss about climate impact and adaptation measures	Communities can discuss about their losses due to natural disasters, but they do not have much idea that the loss was due to climate change and can some extent be avoided	Discussion with communities Observation of people's communications
4. Prioritizing and implementing local investment by promoting	Number of communities strengthened for CBA	None of the communities in the project areas are implementing CBA	Publications of district level line agencies

Project Component	Impact indicator	Baseline	Means of verifications
CBA to strengthen livelihood strategies and transfer of adaptation technology	Number of farmers having sustained yield from agricultural activities	Fluctuations on agricultural productivities are up to 50%	Discussions with communities

The impact evaluation needs baseline survey, mid-term evaluation and ex post impact evaluation. Tentative budgets for these activities are presented in the following table.

Table: Budget for baseline survey and impact evaluations

	Tasks	Quantity	Rate (US$)	Budget (US$)
A	**Baseline**			
1.	Questionnaire design and preparation of the plan of impact evaluation	1	1000	1 000
2.	Survey of the 20% participant households (5 households per group)	500 HH	4	2 000
3.	Survey of control households	200 HH	4	800
4.	Travel expenses	4 districts	300	1 200
5.	Data compilation, analysis and baseline report writing	2 persons	1500	3 000
	Sub-total			8000
B	**Mid-term evaluation (after completion of two years of implementation)**			
1.	Survey of participant households (2 participants per group)	240 HH	5	1 200
2.	FGD with groups with 10% of the participating groups	12	200	2 400
3.	Travel expenses	4 districts	500	2 000
4.	Report writing			2 400
	Sub-total			8 000
C	**Impact Evaluation (ex post)**			
1.	Survey of participant households (3 participants per group)	360 HH	5	1 800
2.	Survey of control households	240	5	1 200
3.	FGD with groups with 20% of the participating groups	24	100	2 400
4.	Travel expenses	4 districts	400	1 600
5.	Impact evaluation report writing (Balance covered from reporting)			1 000
	Sub-total			8 000
	Grand total (A+B+C)			24 000

Annex VIII: List of key existing framework for vulnerability and adaptation assessment

Framework Approach/Methods	Agencies/Authors	Key features and Limitations
Community based Vulnerability Assessment Methods and Tools (Nepali language)[15]	MOSTE, 2010 Practical Action, WWF, IUCN, Center for International Studies Cooperation Nepal (CISC) and Federation of VDCs	The tools are developed on the participation basis. It is particularly focused on plan formulation not for research and academic study. The tools and methods help in mainstreaming of VDC and DDC annual development plans in implementation in integrated approach but not assist in implementation of adaptation plans. Local officers should have a knowledge in PRA and aware about climate change to use the tools. The following principles are adopted in the methods. In general, climate change adaptation community attempted climate change vulnerability assessment in line with IPCC definition (defined as function of character magnitude and rate of climate variation to which a system is exposed, its sensitivity and its adaptive capacity). But, the IPCC does not present participatory or community based vulnerability assessment frameworks. The tools are developed on the participation basis. It is particularly focused on plan formulation not for research and academic study.
	CARE International Dazé, Ambrose, & Ehrhart, 2009	Focuses on the qualitative aspects of addressing the underlying causes of vulnerability at a variety of scales (from national to household/individual)
Vulnerability to Resilience (V2R)	Practical Action Pasteur, 2010	The framework stresses the dynamic and cyclical nature of building resilience to climate change, which makes numerical measurement difficult
Vulnerability Assessment Framework	IUCN Marshall, et al., 2009	The framework focuses on obtaining qualitative data from communities and triangulation it with scientific data
	Tearfund Wiggins, 2009	Focuses on the quantification of risk posed by various climate-related hazards, which allows for the prioritization and selection of adaptation options but it does not develop a quantification of overall vulnerability taking adaptation into account
CRiSTAL (Community-based Risk Screening Tool-Adaptation and Livelihoods)	International Institute for Sustainable Development (IISD) IISD	It is an interactive, step-by-step tool for quantifying livelihood components in relation to hazards. It specifically address heavily on hazards with no account of seasonal or projected changes, coping strategies rather than adaption, and the impact on existing project rather than communities. The framework, quantification is not carried forward to make an assessment of vulnerability. The CRISTAL tools also focuses on hazards referred also as current risks and future risks. And subsequent vulnerability and livelihood analysis
	LFP and UKAid	The Community based tool kit for practitioners developed by LFP and UKAid is based on

[15] http://www.adb.org/sites/default/files/projdocs/2012/40545-012-nep-tacr-15-ne.pdf

		sustainable livelihood framework.
Vulnerability Assessment Book-Evaluating Climate Change and Development	The World Bank Van den Berg & Feinstein, 2009	The toolkit is focus on to quantify vulnerability in terms of existing condition and assets (physical, biological, social, economic, and cultural), and the impacts of changes and hazards on those conditions.
Assessment methods based on Livelihood Vulnerability Index	WWF India	The methods presented quantitative treatment to IPCC definition to assess vulnerability by setting out indicators that qualifies exposure, sensitivity and adaptive capacity and normalized values for each indicators to come up with five outputs profiles (climate, demographic, agriculture, Ecosystem and socio-economic). However this is macro-level analysis based on secondary data, use of GIS application and involves several steps moving from indicators to profiles and ultimately to the final vulnerability index.
Adaptation Policy Framework	The UNDP Adaptation Policy framework (APF)	The framework provides guidance on designing the implementing projects that reduce vulnerability to climate change by both reducing potential negatives impacts and Enhancing any beneficial consequences of a changing climate (Bo & Siegfried, 2004). APF on its conceptual framework to define vulnerability have consider IPCC definition as V= R-A Where R is Risk i.e predicted adverse climate impacts and A is Adaptation. In defining risk, taking note from hazard literature R= H x V where R is risk (probability of hazard occurrence), H is climatic hazard (potential threat to humans and welfare) and V is vulnerability (exposure and susceptibility to losses).
Adaptation Toolkit: Integrating Adaptation to Climate Change into Secure livelihoods	Christian Aid	The toolkit address Exposure with the parameter of Current climate trends (seasonal), climate induced events, and Climate projections and Community based and scientific data. Sensitivity consist the parameters such as Current hazard trends, Bio physical impacts, Livelihoods impacts and Hazards prioritization. And Adaptive capacity: consists of Coping strategies, Livelihood assets, Building community awareness, knowledge and information
Participatory Tools and Techniques for Assessing Climate Change Impacts and Exploring Adaptation Options	LFP and Ukaid	The framework consists of Climate induced events, community based and scientific data are the parameters for exposure assessment. For Sensitivity assessment Current hazard trends, Bio physical impacts, Livelihoods impacts and Hazards prioritization and for adaptation assessment, Coping strategies, and Livelihoods assets
Vulnerability and Capacity Assessment (VCA)	International Federation of Red Cross and Red Crescent Societies (IFRC)	VCA is concerned with collecting, analyzing and system arising information on a given community's vulnerability to hazards, disaster risk and existing capacities of the community.
Participatory Vulnerability Analysis (PVA)	ActionAid International	The framework supports for the assessment of disaster risk by including hazards, vulnerability and capacity in a participatory approach. The framework includes: situation analysis; analysing causes;

		analysing community action; and drawing action from analysis. The key tools are: Focus group discussions; Historical profile/time line; Vulnerability map; Seasonal calendar to map out when most vulnerabilities occur during the year; Livelihood analysis.

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Annex IX: LAPA Formulation Procedures and Estimated Cost for 24 LAPA Formulation

LAPA framework is a guiding document for a formulation of LAPA (MOSTE, 2011). The steps given in the framework will be adopted in the formulation of the LAPA in 24 VDCs (Figure). There are seven steps that need to be adopted in the LAPA formulation. The climate sensitivity on the infrastructures related to agriculture promotion will be emphasized in the assessment.

Climate change sensitization at District, Village and Ward Levels: Climate change sensitization is a first step that needs to be carried out at all levels-District, VDC and Ward. A participation approach by including Dalit, women, indigenous and economically discrimination people is required. The objective of LAPA and its importance in local development will be highlighted in the sensitization programme.

Climate vulnerability and adaptation assessment: None of the existing approaches, methods and tools is specifically focused on a climate vulnerability and adaptation assessment particularly for agriculture sector in the country. A common principle defined by IPCC for climate sensitivity and adaptation assessment will be adopted. Detailed procedures for the assessment will be given in a climate vulnerability and assessment report. The report will be prepared during the project implementation by reviewing the existing methods and tools and practices. Gaps and lesson learned will be identified in the review. Based on the assessment report, a framework including methods and tools will be developed for a detailed climate vulnerability and adaptation assessment in agriculture sector. The framework will be used in this step during the formulation of LAPA.

LAPA Formulation: After having sensitization at all levels and climate vulnerability adaptation assessment in all 24 VDCs separately, LAPA will be prepared for each VDC of the selected VDCs. A detailed discussion with the local community in all 9 wards of each VDC will be carried out during the formulation of the LAPA of the VDC. The adaptation measures will be prioritized in the LAPA so that the measures can be implemented through the limited resources of the project.

Integration of adaption plans in local and national level plans: The formulated LAPA will be endorsed in all level of planning process particularly from Citizen Ward Forum to VDC council. The LAPA will be given a high priority in annual plan of the VDC. The LAPA of each VDC will be discussed in District level for the support at district level. The LAPA will be integrated in National Planning process through a strong coordination among Ministry of Science, Technology and Environment, Ministry of Agriculture Development and Ministry of Federal Affairs and Local Development.

Gender Empowerment for Effective Integration: Involvement and participation of women will be a key role in the implementation of LAPA. Adoptive capacity of women will be given a high priority in LAPA in the project VDCs. Women issues such as capacity development for income generation, decision making in local development, skills, knowledge to reduce impacts of climate change and disasters will be given a high priority in LAPA formulation and implementation.

Implementation of LAPA: The sectorial adaptation measures will be implemented by VDC and respective sectorial agencies in coordination with VDC and DDC and local agencies including NGOS, CBOs and private sectors. Adaptation measures particularly related to agriculture and livestock promotion identified in the LAPA will be implemented by the District Agriculture Development and District Livestock Development through the support of the project in coordination with VDC and DDC at local level. The knowledge and skills for the local farmers in order to implement the adaptation measures will be provided Farm Field School (FFS).

Monitoring and Evaluation of implementation of LAPA: In order to achieve the outcomes and outputs of the implementation of LAPA, monitoring and evaluation will be carried out at all levels from Ward level to District level. An effective accountability mechanism will be developed in the monitoring and evaluation.

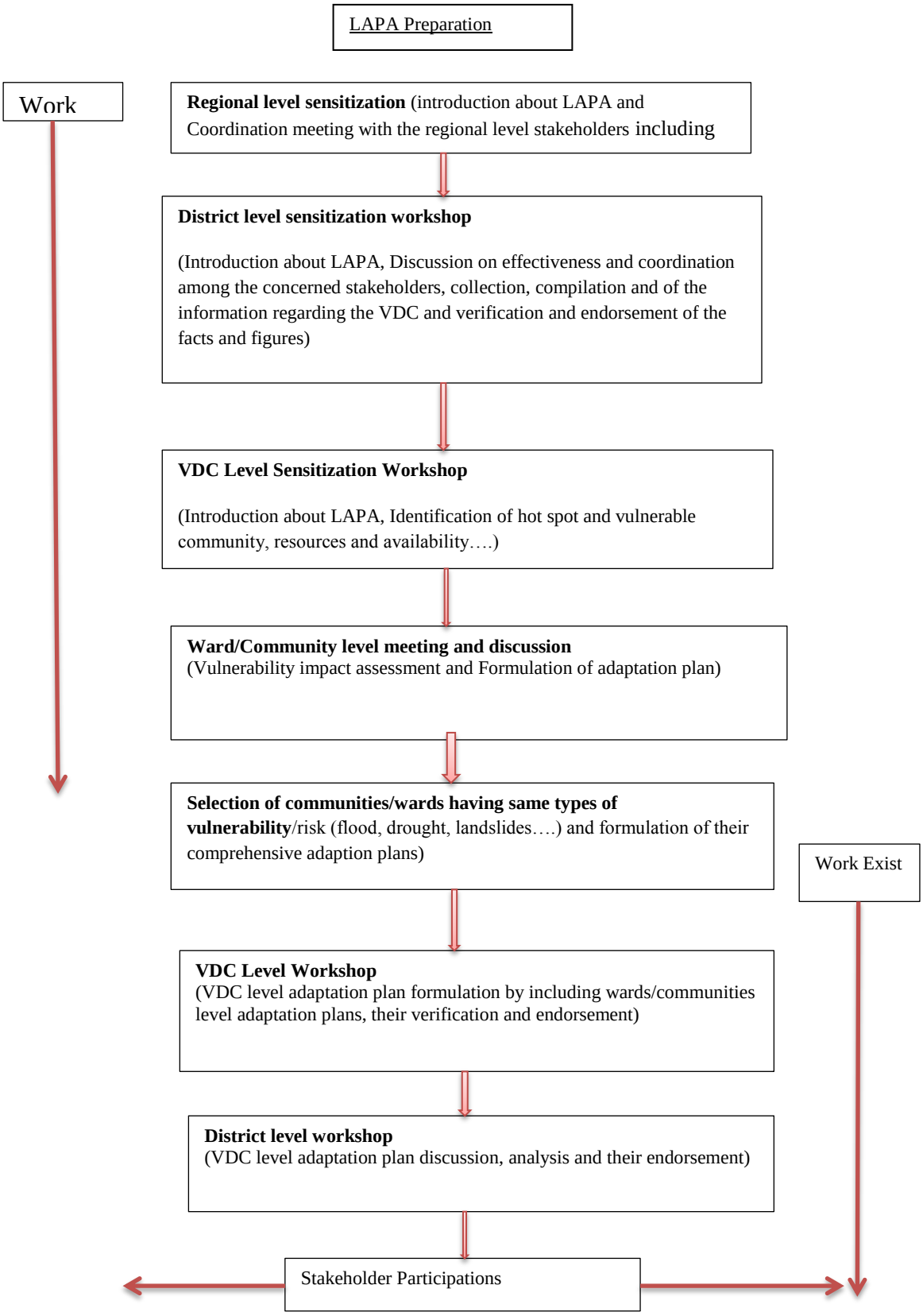

Figure 1: LAPA Formulation Steps

Table .The Cost estimation for one VDC for One LAPA Formulation

SN	Activities	Remarks
1	Central/Regional level meetings	Covered from other meetings.
2	District level workshops	First Workshop: Sensitization; Second workshop: Sharing, formulation and the plan and incorporation of the feedback and endorsement.
3	VDC level workshops	First Workshop: sensitization; Second workshop: Sharing, formulation and the plan and incorporation of the feedback and endorsement.
4	Ward level programs	Sensitization and Assessment, One day for one ward .
5	Field Orientation Training	Training for VDC level facilitators (24 Facilitators) and the activities will be linked to the FFS implementation.
6	Team leader	One TL for all LAPA project is required. TL is a high level expert (7 years professional experience). The work will be over seen by the national technical coordinator and will be closely linked to the activities of district level office.
7	Facilitators	Facilitators is midlevel experts (priority to environmental science Main responsible for LAPA document compilation and preparation.
8	Social Mobilizers (SMs)	Social Mobilizer from the local (programme VDC. SM is expected to assist to TL (general) and Facilitator (particularly)
10	Document preparation	Stationary and Printings, Dissemination, posters, banners and Endorsement
12	LAPA reviewer	The expert will review the final document for consistency before submitting the request for endorsement.

Annex X: Released and recommended varieties of major cereals in Nepal (excluding hybrid varieties)

	Name of Released Varieties	Release Year	Potential t/ha	Recommended Domain	Stress tolerant	Suitable for U=Udayapur, S=Siraha, K=Kapilbastu, A=Argakhanchi
	Early Rice (April to July)					
1	Hardinath-1	2004	5.0	Terai, Inner Terai		SUK
2	Chaite-6	1991	4.8	Terai, Inner Terai		SUK
3	Chaite-4	1987	4.5	Terai, Inner Terai		SUK
4	Chaite-2	1987	4.8	Terai, Inner Terai		SUK
	Main Season Rice (July to November)					
1	Sanwa Masuli Sub-1	2011	3.5-4.0	Terai, Inner Terai and Mid-hills up to 500m irrigated and submerged	Submerge tolerant	USAK
2	Barshe-1027	2011	3.3	Unirrigated Terai and Mid-hills up to 1000 m	Drought tolerant	USAK
3	Sworna Sub-1	2011	4.0- 5.0	Terai, Inner Terai and Mid-hills up to 500m irrigated and submerged	Submerge tolerant	USK A (partially)
4	Barshe-2014	2011	3.6	Terai		SK
5	Sukkha Dhan-3	2011	2.5-3.6	East and West Terai, Inner Terai and mid-hill (up to 500m)	Drought tolerant	USK A (partially)
6	Sukkha Dhan-2	2011	2.3-3.5	East and West Terai, Inner Terai and mid-hill (up to 500m)	Drought tolerant	USK A (partially)
7	Sukkha Dhan-1	2011	3.2-4.2	East and West Terai, Inner Terai and mid-hill (up to 500m)	Drought tolerant	USK A (partially)
8	Tarahara-1	2010	4.2	Mid and Eastern Terai		S
9	Hardinath-2	2010	3.1-4.2	Terai, Inner Terai		SKU
10	Lalka Basmati	2010	2.5-3.5	Mid and Eastern Terai		S
11	Sunaulo Sugandha	2008	3.8	Terai, Inner Terai		SKU
12	Khumal - 8	2007	9.8	Tar, Foot-hills to Mid-hills		UA
13	Loktantra	2006	3.6	Terai, Inner Terai, Low hills and Mid hills		SUKA
14	Mithila	2006	5.0	Terai		SK
15	Ram	2006	4.9	Central terai, Siwalik Valley		USK

16	Barkhe3004	2006	3.9	Terai and Inner Terai		USK
17	Rampur Mansuli	1999	5.7	Terai, Inner Terai and Foot Hills		USK A (partially)
18	Radha-12	1994	4.6	Eastern Terai	Rainfed Lowland	S
19	Radha-11	1994	4.0	Central-Terai	Rainfed	S
20	Radha-7	1991	3.5	Terai, Inner Terai	Rainfed Lowland	SK
21	Barkhe-2	1987	4.3	Terai, Inner Terai		USK
22	Makwanpur-1	1987	4.8	Terai, Inner Terai		USK
23	Khumal-4	1987	6.3	Mid Hill		UA
	MAIZE					
1	Manakamana-6	2010	5.34	Eastern Mid Hill		U
2	Manakamana-5	2010	5.27	Mid Hill		UA
3	Posilo Makai	2008	5.3	Mid Hill up to 1600m		UA
4	Manakamana-4	2008	5.3	Mid Hill up to 1600m		UA
5	Deuti	2006	5.7	Mid Hill		UA
6	Shitala	2006	6.1	Mid Hill		UA
7	Manakamana-3	2002	10.6	Mid-Hills of EDR, CDR &WDR		UA
8	Rampur-1	1995	3.8	Terai, Inner Terai		SKU
9	Arun-1	1995	4.0	Terai, Inner Terai		SKU
10	Rampur-2	1989	4.0	Terai, Inner Terai		SKU
11	Manakamana-1	1987	4.0	Mid Hill		UA
12	Rampur Composite	1975	4.4	Terai, Inner Terai		SK UA(partially)
	WHEAT					
1	Dhaulagiri (BL 3503)	2012	3.6-4.9	Mid and high hill		UA
2	Gaura (BL 3235)	2012	4.2-5.0	Mid and high hill		UA
3	Vijaya	2011	4.4	Terai and valley up to 500m		SK
4	NL-971	2010	4.5	Terai and valley up to 500m		SK
5	Aaditya	2010	4.8	Terai and valley up to 500m		SK
6	WK 1204	2007	3.4	Mid and high hill		UA
7	Gautam	2004	5.0	Terai, Tar and Foot-hills (<500m)		SK
8	BL-1473	1999	4.0	Terai, Taar and low altitude (<1000 m)		SKU
9	Kanti	1997	5.5	All Hill areas		UA
10	Rohini	1997	4.1	Terai, Taar and < 1000 m		SKU

11	Achyut	1997	4.5	Terai, Taar and < 1000 m		SKU
12	Bhrikuti	1994	5.0	Terai (Early and Late sowing)		SK
13	BL-1022	1991	5.0	Western Terai		K
14	Annapurna-3	1991	5.5	Hilly areas		UA
15	Annapurna-2	1988	5.0	Mid Hill		UA
16	Annapurna-1	1988	5.5	Hilly areas		UA
17	Nepal-297	1985	5.0	Terai (Late sowing)		SK

Annex: XI Terms of Reference (TOR) for national and international experts

National Project Director
(Appointed by the Government and no cost to the project)

Under the supervision of the Ministry of Agricultural Development (MOAD), and in close coordination with the FAOR office in Kathmandu, Nepal and FAO headquarters, the National Project Director (NPD) will be responsible for the overall execution of the project. He/she will ensure adequate collaboration between the project team from the DOA, DLS and all selected district offices and the regional directorates; as well as other government agencies at national, district and local levels and other partners thus ensuring smooth and effective project implementation. He/she will be responsible for the organizational and logistical arrangements and the mobilizing and coordinating the technical support services required from national level for the effective implementation of all aspects of the project. He/she will be responsible for the overall reporting *vis-á-vis* the MOAD and FAO. In particular, he/she will:

- Be responsible for overall management and implementation of the project activities
- participate in the preparation of the detailed work plan for the project;
- assist in identifying candidates for the national consultancy;
- supervise and advise on the implementation of the field activities;
- provide overall technical guidance to the design and implementation of the national, district and local level training and capacity building process;
- ensure intensive and regular networking and transparent collaboration with other government line agencies at national, regional, district and local levels [Illaka and Village Development Committees (VDCs)] as well as with other partner agencies and subcontractors;
- act as a member secretary to the Project Steering Committee (PST) and liaise with other members of the steering committee for inter-ministerial and departmental collaboration and for effective delivery of project outputs and outcomes.
- ensure project representation and contribute to relevant meetings/consultation related to climate change adaptation in agriculture sector.

Qualifications: longstanding field experience at local and national level with planning, implementation and monitoring of sustainable agricultural development and/or natural resource management and/or climate change adaptation activities.

Duty Station: Kathmandu and need based travel to pilot districts.

Duration: entire period of the project.

National Technical Coordinator
(Climate Change Adaptation in Agriculture)

Under the overall supervision of the National Project Director (NPD) and the FAOR and the technical supervision of the Lead Technical Office (LTO)/ Lead Technical Unit (LTU), and in close collaboration with the relevant agencies of the Ministry of Agricultural Development (MOAD) and other project partners, the national expert will conduct the following major tasks at national and local levels;

- provide overall implementation support to the National Project Director (NPD) and provide technical coordination support for smooth implementation of the project.
- assist NPD in organizing project meetings, workshops and training programmes at national, district and local levels;

- facilitate the work of the national and international experts, project partners, subcontractors in carrying out their situation assessment, training need assessment, documentation of climate change adaptation practices;
- assist the Project Steering Committee members through the NPD in preparation of relevant documents and organization of periodical steering committee meetings
- conduct a series of brainstorming sessions with a range of key stakeholders to discuss the future role and the comparative advantage of MOAD in Climate Change Adaptation and collect the expectations from other agencies *vis à vis* the role of MOAD in CCA at national and local level;
- analyse the institutional aspects and policy requirements to better link the agriculture sector into Climate change policies and plans in Nepal and monitor mainstreaming of CC priorities into relevant policies and plans;
- building on the lesson learned from project implementation process and pilot interventions in selected districts, facilitate a discussion process within MOAD at all levels to better integrate agricultural perspectives into Local Adaptation Plans of Action (LAPA) in 24 VDCs.
- assess institutional and policy requirements to better link the current and longer term climate change adaptation at district and local levels;
- prepare a field demonstration plan at the beginning of each season and assist the NPD in organizing the demonstrations through subcontracted organizations and district technical coordinators;
- assist the NPD in organizing workshops, training programmes, study tours and exchange visits;
- participate in the project wide workshops and training programmes organized by MOAD in association with the subcontracted organizations;
- assist the subcontracted organizations in setting up of climate information networks within MOAD and at the district levels;
- assist district level DOA/DLS officers and VDC mobilizers in preparing the community level adaptation plans and to implement the priorities through the FFS.
- Assist NPD and FAO to prepare periodical reports (workshop reports, inception, mid-term and evaluation and monitoring reports)
- submit a substantive technical report at the end of the assignment
- any other duty required to support a successful implementation of the TCP project.

Qualifications: advanced degree in agriculture and related subjects together with long standing field experience at local and national level on planning, implementation and monitoring of climate change adaptation programmes in Nepal.

Duty Station: Kathmandu, Nepal and need based travel to pilot districts.

Duration: 45 months

National Expert
Climate Change Adaptation in Livestock Sector

Under the overall supervision of the FAOR and the technical supervision of relevant technical units in FAO and in close collaboration with the Ministry of Agricultural Development (MOAD), the National Project Director (NPD), FAO technical backstopping officers, LTO/LTU and other project staff, the national expert will perform the following tasks:

- carry out an in-depth survey and analysis about the current situation of flood, drought and other climate extreme effects on livestock and poultry in the project area;
- assess options and their implications (financial, environmental, social, instructional and logical for both the livestock owner and the public services) for protecting small livestock and poultry against seasonal droughts and flooding;
- assist national and district level functionaries in formulating a local contingency plan against livestock epidemics;

- preparing training material and design demonstrations to support the uptake of the more appropriate interventions that have been identified to better protect animals against climate risks (seasonal droughts and flooding) including options/measures to prevent livestock epidemics;
- submit a substantive technical report at the end of the mission;
- provide any other duties which may be identified and agreed upon with the LTO during field work to support improved small livestock production in the pilot districts.

Qualifications: higher degree in animal production or veterinary science. Over ten years of practical experiences or applied research in livestock production (cattle, buffalo, poultry, goats, sheep, etc.). Good knowledge of impact of climate risks on livestock production and flood and drought related risk preventive/mitigating interventions.

Duty Station: Kathmandu, Nepal and need based travel to pilot districts.

Duration: 18 months

National Expert
Climate Data Analysis and Climate Information Systems

Under the overall supervision of the FAOR and the technical supervision of the relevant technical units in FAO, in close collaboration with the Department of Hydrology and Meteorology (DHM), the Ministry of Agricultural Development (MOAD), the National Project Director (NPD), FAO technical backstopping officers and other project staff, the national expert will perform the following tasks:

- assess data and information gaps as perceived by the Department of Agriculture (DOA), MOAD, Community-based Organizations (CBOs), and farmers;
- Liaise with the Department of Hydrology and Meteorology (DHM) and closely work with them to access the new forecast products expected to be developed under the PPCR project
- Work closely with both the Department of Hydrology and Meteorology (DHM) and MOAD and set up a mechanisms to receive the new forecast products at the MOAD and help DOA and DLS to process the forecast
- Assist to analyse the climate data of the selected districts/VDCs and help to develop customized information products to be used by the district technical team, VDC level community mobilizers and FFS
- Assist to develop new information products, impact outlooks and management alternatives in DOA/DLS based on the new forecast products form DHM
- Assist to set a communication mechanism between DHM, MOAD, DOA/DLS, DADO/DLSO, VDCs and community and farmer groups so as to receive forecast information for timely decision making
- Assist to assess the current status of the agro-meteorological observatories in the selected districts and develop joint proposals for up-gradation of observatories

Qualification: higher degree in meteorological sciences, preferably with agricultural meteorology with sufficient background on database management and setting up of the climate information systems linking climate information providers and users in agricultural sector.

Duty Station: Kathmandu, Nepal and need based travel to pilot districts.

Duration: 9 months.

National Expert

Crop Monitoring and Yield Forecasting

Under the overall supervision of the FAOR and the technical supervision of the relevant technical units in FAO, in close collaboration with the Ministry of Agricultural Development (MOAD), the National Project Director (NPD), FAO technical backstopping officers and other project staff, the national expert will perform the following tasks:

- add to the current climate and crop data collection practice, and routine parameters/questions sheets so that the data will become more useful as a basis for climate risk management related information and crop monitoring and yield forecasting, and able to respond to information demands of farmers;
- participate in district level training programmes and offer training to front line extension staff on data collection (climate impacts, damage to infrastructure, loss to production, etc.) according to the new format to be elaborated;
- design and assist to develop a database at the statistics division of .the MOAD and prepare a strategic documents guided by the stakeholders to ensure sustainability;
- assist to develop a suitable crop monitoring and yield forecasting methodology in close collaboration with the international expert
- assist to develop necessary data, tools and methods for crop monitoring and crop yield forecasting
- submit a substantive technical report at the end of the assignment;
- provide any other duties which may be identified and agreed upon with the Lead Technical Unit (LTU)

Qualification: Higher degree in Meteorology, preferably agro-meteorology with sufficient background on database management and data archiving, crop monitoring and yield forecasting.

Duty Station: Kathmandu, Nepal and need based travel to pilot districts.

Duration: 9 months.

National Expert

Livelihoods Development and Gender

Under the overall supervision of the National Project Director (NPD), the FAOR and the technical supervision of the relevant technical units in FAO, and in close collaboration with the Ministry of Agricultural Development (MOAD), Department of Agriculture (DOA) and Department of Livestock Services (DLS) and other partners, the national expert on livelihood development will carry out the following tasks:

- in-depth assessment of the physical/environmental parameters influencing or influenced by the local hazard context, and conditions for agricultural production;
- livelihood profiling using existing methodologies to characterize:
  - the livelihood groups most vulnerable to climate risks;
  - their capacity and coping strategies;
  - their existing agricultural practices (crops, livestock, fisheries, and homestead, etc.);
  - their access to the natural resource base, agricultural inputs, services and other assets;
- local institutional assessment; their role, capacities and strengths weaknesses, needs (including training needs) and gaps in the context of climate change adaptation in agriculture; capacities of local institutions to implement coping and adaptation strategies against climate risks, giving special consideration to assessing the role of women, the elderly and children; local perceptions and ideas about the role, capacities and needs (including training needs) of farmer associations.
- development and prioritization most suitable and location specific livelihood strategies and income generating activities relevant to different livelihood groups including women and most vulnerable groups

- review and assess from a gender perspective relevant materials related to gender, natural resource management and lessons learned from past and ongoing development and research projects in Nepal related to disaster prevention and preparedness;
- with technical support from the ESW officer, provide technical and methodological advice for inclusion of gender issues in project baseline and monitoring and evaluation activities, paying particular attention to the livelihood profiling and local perceptions components of the project baseline studies;
- provide technical advise and support to the district technical team and VDC level community mobilizers to properly identify and prioritize suitable livelihood options for the LAPAs
- provide technical support for implementation of livelihood options and income generating activities at the community level through the FFS farmer groups
- at the conclusion of the consultancy, prepare a report in English covering livelihood development and gender

Qualification: Higher degree in social sciences and with sufficient background/experience in livelihood development and gender related aspects. Experience in working with farmers and extension workers to manage climate risks is preferred.

Duty Station: Kathmandu, Nepal and need based travel to pilot districts.

Duration: 18 months

National Expert

Policy and Mainstreaming

Under the overall supervision of the National Project Director (NPD) and the FAOR and the technical supervision of the relevant units in FAO, and in close collaboration with the Department of Agriculture (DOA), Department of Livestock Services and Nepal Agriculture Research Council (NARC), the Ministry of Agricultural Development (MOAD) and other project partners, the contractor will conduct the following major tasks at national and local levels;

- conduct a series of brainstorming sessions with a range of key stakeholders to discuss the future role and the comparative advantage of MOAD, DOA and DLS in climate change adaptation
- analyse the institutional aspects and policy requirements to better link the agriculture sector into new climate change policy and strategy in Nepal
- assess institutional and policy requirements to better link the current and longer term climate risk management activities at district and local levels;
- participate in all national level policy development activities related to agricultural sector and analysis the possibilities for mainstreaming climate change concerns into agriculture and food security policies and plans
- assist NPD in organizing consultation meetings at the national level to identify needs for mainstreaming
- assist to analyse the policies, plans and strategies of agriculture sector and assess the level of integration of climate change concerns into those documents
- assist to analyse the climate change policies, plans and strategies and identify the level of integration of agriculture and food security aspects into the climate change policies
- submit a substantive technical report at the end of the mission;
- any other duty required to support a successful implementation of the project.

Qualifications: advanced degree in agriculture and related subjects together with long standing field experience at local and national level on planning, implementation and monitoring of climate change adaptation programmes in Nepal. Experience in institutional assessment and mainstreaming is an advantage.

Duty Station: Kathmandu, Nepal and need based travel to pilot districts.

Duration: 12 months.

National Expert

Knowledge Management and Communication

Under the overall supervision of the National Project Director (NPD) and the FAOR and the technical supervision of the relevant units in FAO, and in close collaboration with the Department of Agriculture (DOA), Department of Livestock Services and Nepal Agriculture Research Council (NARC), the Ministry of Agricultural Development (MOAD) and other project partners, the contractor will conduct the following major tasks at national and local levels;

- review current awareness raising and knowledge management options followed by the MOAD and its allied departments at all levels
- identify innovative options to institutionalize awareness-raising on climate change adaptation
- assist to design the Farmer Field School (FFS) approach and integrate knowledge management and awareness raising components
- facilitate the formulation of awareness-raising, knowledge management and communication strategies by organizing relevant meetings, consultations and workshops
- assist to design and implement through campaigns, field days and farmer exchange visits the awareness rising programmes
- support to design and prepare tools and methods for awareness raising and knowledge management at all level in close collaboration with other national experts
- finalize the knowledge management and communication strategy and submit it to the project management unit for endorsement by the MOAD, Government of Nepal

Qualifications: advanced degree in biological/social sciences and/or related subjects together with long standing field experience at local and national level on knowledge management, awareness rasing and communication.

Duty Station: Kathmandu, Nepal and need based travel to pilot districts.

Duration: 3 months.

National Experts

District Technical Coordinators

Under the overall supervision and guidance of the National Project Director (NPD), the FAOR and the technical guidance of relevant technical units in FAO and in close collaboration with Project Management Unit (PMU) and District Project Unit (DPU), FAO technical backstopping officers and other project staff and partner agencies, the district technical coordinators will perform the following tasks:

- collect relevant primary and secondary data from the district and VDC levels as and when required;
- support District Project Unit (DPU) to implement the project in respective districts and VDCs;
- assist in organizing and conducting orientation workshops/meetings in each VDC/FFS to explain the project objectives and activities;
- initiate awareness creation process on climate change adaptation and support the project implementation team in awareness raising efforts at district and VDC levels;

- identify local partners/farmers groups/farmer field school/ individual households, including women and women's groups, potentially interest to collaborate in the pilot demonstrations;
- promote and facilitate discussion between farmers, farmer groups and district task groups about selection of locally preferred/ acceptable climate change adaptation options for pilot testing;
- assist in organizing field demonstrations at field level to test and familiarize viable adaptation practices;
- assist to implement and monitor the field demonstrations and collect periodical data for comparison and impact assessments;
- assist the district level officers in preparing easily understandable extension tools and methods for familiarising "good practice" examples;
- assist in organizing district and VDC level workshops, participatory discussions, brain storming sessions and training programmes;
- facilitate broader replication of successfully tested adaptation practices and technology options within the farming communities;
- liaise with the project team at the national level and district level implementation task groups on day to day activities and provide feedback to all necessary project partners, consultants and other project staff.

Qualifications: Basic/Undergraduate degree in agriculture and/or related subjects together with field/on-farm experience on planning, implementation and monitoring of field demonstrations, disaster preparedness and climate change adaptation programmes/activities. Master's degree with experience of conducting of field trials/demonstrations is preferable.

Duty Station: Selected districts (Kapilvastu/Arghakhanchi/Siraha/Udaipur) of the project in Nepal and need based travel to VDCs and to Kathmandu.

Duration: 42 months

International Expert

Knowledge Management and Communication

Under the overall supervision of the National Project Director (NPD) and the FAOR and the technical supervision of the relevant units in FAO, and in close collaboration with the Department of Agriculture (DOA), Department of Livestock Services and Nepal Agriculture Research Council (NARC), the Ministry of Agricultural Development (MOAD) and other project partners, the contractor will conduct the following major tasks at national and local levels;

- identify good practice examples and screen them based on the indicators: environment friendliness, potential to reduce the impacts of climate risks, economic viability, sustainability, social acceptability, gender sensitivity, income generation, enterprise diversification, seasonal relevance and community's need.
- packaging of at least 25 successfully tested and replicable adaptation practices identified and tested at the field level
- packaging of information on new varieties of fruit trees or multi-purpose tree species suitable for reducing the climate related risks under changing conditions
- package successfully implemented livelihood and income generating options focusing on most vulnerable communities including gender considerations
- prepare document of good practices to be integrated into national and global data portals identified by the PMU and the Government

Qualifications: advanced degree in biological/social sciences and/or related subjects together with long standing field experience at local and national level on knowledge management and packaging of good practice examples.

Duty Station: Kathmandu, Nepal and need based travel to pilot districts.

Duration: 6 weeks.

International Expert

Climate impacts, climate information systems and data analysis expert

Under the overall supervision of the National Project Director (NPD) and the FAOR and the technical supervision of the relevant units in FAO, and in close collaboration with the Department of Hydrology and Meteorology (DHM), the Ministry of Agricultural Development (MOAD) and other project partners, the contractor will conduct the following major tasks at national and local levels;

- provide technical advise on improvement of databases, tools and methods for vulnerability and risk assessment and to define the hotspots of vulnerability
- provide technical support for improvement of agro-meteorological advisories to farmers by integrating newly developed forecast products
- provide technical support to strengthening of agro-climate monitoring infrastructure in selected 4 districts in close coordination with other similar projects
- contribute to strengthening of the current crop monitoring work of the of the Ministry of Agriculture and Development and focus on application of information products
- provide technical advise to implement tools and methods for climate change impact assessment by the NARC environment unit
- provide technical support to implement tools and methods for crop monitoring and yeidl forecasting by the agribusiness promotion and statistics division of MOAD

Qualifications: advanced degree in meteorology/agro-meteorology or in biological sciences with significant work experience in agricultural meteorology.

Duty Station: Kathmandu, Nepal and need based travel to pilot districts.

Duration: 8 weeks