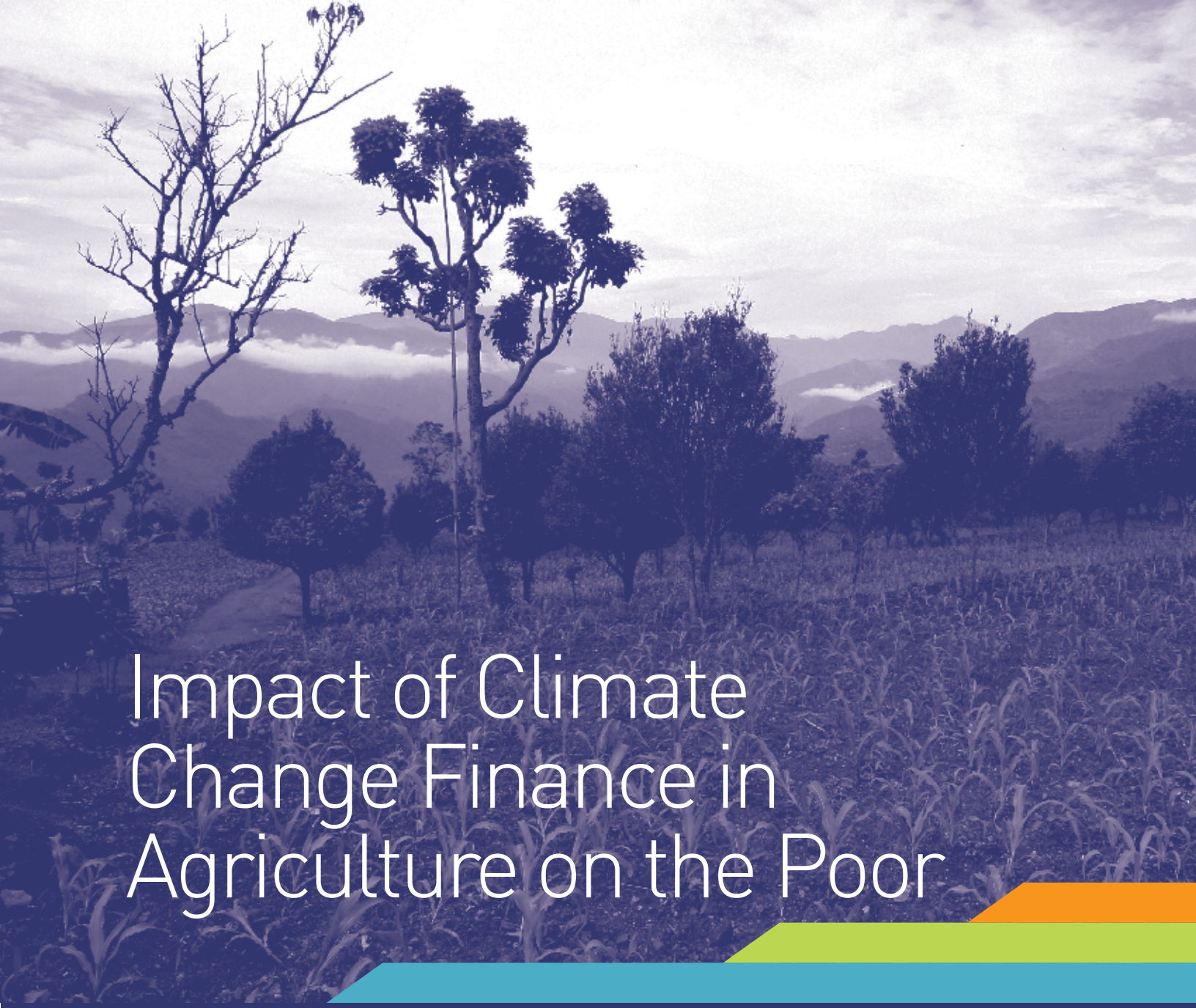

Impact of Climate Change Finance in Agriculture on the Poor

GOVERNMENT OF NEPAL
MINISTRY OF AGRICULTURAL, LAND MANAGEMENT AND COOPERATIVES
SINGHADURBAR, KATHMANDU, NEPAL

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Foreword

The impacts of climate change in the agriculture sector in Nepal have been observed in multiple ways. The crop losses due to severe floods, extended droughts, emergence of diseases and proliferation of insect pests, all of which are closely related to the impacts of climate change, have been increasing both in coverage and frequency in recent years. The flood events in the southern part of the country on August 11-14, 2017 wiped out crops worth Rs. 8.11 billion rupees in 14 districts that are known as bread basket of the country. The emerging evidences show that agriculture will be hard hit by climate impacts in the years ahead. Measures to prevent or respond to the potentially devastating impacts must be planned and put in action.

As agriculture contributes to about a third of the national GDP and engages nearly two-third of the population, the Government of Nepal has accorded high priority to make agriculture resilient to climate impacts. The Agriculture Development Strategy has recognized climate change as a major concern to achieve agricultural growth. Several programmes in agriculture have been planned in ways that help respond to problems that are similar to the ones caused by climate change. Managing local water sources and introducing nonconventional irrigation systems in drought affected areas are some examples of such programmes that have helped small landholders to adapt to water scarcity.

Public finance to support climate related programmes in agriculture play a significant role in making them resilient to climate impacts. However, mainstreaming climate change and climate finance in the planning is a reiterative process which requires that the results of the ongoing climate-related programmes are regularly fed back into formal oversight and decision making process in order to ensure that budget allocations effectively help achieve the intended results on the ground.

Monitoring and evaluation of the programmes is key in generating information required for informed decision making. For this, the CSOs' involvement has been increasingly recognized for an impartial assessment and analysis of the results of the programmes. Taking this into account, the Ministry of Agriculture Development (MoAD) has conducted an evaluation study on impact of climate related programmes and its budget in collaboration with National Disaster Risk Reduction Centre (NDRC). The findings are expected to serve as reference material to help the policy makers and planners for effective planning and resource allocation.

This study is first of its kind in Nepal where government, civil society and donors worked collaboratively to generate the evidences of socioeconomic impact of climate related public investments. The MoAD provided guidance in the design of the study and supported researchers to access necessary data and conduct field work. Technical inputs were also provided by United Nations Development Programme (UNDP) at various stages of the study and report preparation. This report provides information about socioeconomic impact of public climate budget in agriculture.

I would like to thank the UNDP for providing technical support and the team of experts of NDRC for conducting this study. I would also like to thank the officials at the MoAD and the District Agriculture Development Offices in Bardiya and Myagdi for their contribution in the study. I hope the decision makers and planners will find the findings of the study useful in integrating climate change in the agriculture plans.

Dr. Yogendra Kumar Karki
Joint Secretary

Disclaimer

Given limited scope of the research conducted within two districts of Myagdi and Bardiya, the findings should be interpreted with caution and as indicative only as in no way they represent the entire agriculture sector of Nepal. Further the findings are based on case studies following qualitative assessment methods, for which secondary data on crop production were used for analysis of change in productivity and people's perceptions were used to understand the socio-economic impacts of climate change investments. The triangulation of productivity data and people's perception about the impacts reveals positive correlation between the two; meaning that climate related public investment in agriculture sector has paid off. However, the research was unable to look into the contributions of other concurrent investments towards the change; hence the findings cannot be only attributed to climate related public investments. The research methodology should be taken as first step towards building foundations for future quantitative analysis to understand the impacts of climate related investments of the government across the sectors.

Abbreviations

ADS	Agriculture Development Strategy
AGDP	Agricultural Gross Development Product
ASC	Agriculture Service Centre
CBS	Central Bureau of Statistics
CCFF	Climate Change Financing Framework
CPEIR	Climate Public Expenditure and Institutional Review
CSISA	Cereal System Initiative for South Asia
DADO	District Agriculture Development Office
DDC	District Development Committee
DPRP	District preparedness response plan
FY	Fiscal Year
GDP	Gross Domestic Product
GHG	Green House Gas
GoN	Government of Nepal
IPM	Integrated pest management
IWRMP	Integrated Water Resources Management Plan
LAPA	Local Adaptation Plans for Action
LDRMP	Local disaster risk management plan
M&E	Monitoring and Evaluation
MoAD	Ministry of Agricultural Development
MoF	Ministry of Finance
MoFALD	Ministry of Federal Affairs and Local Development
MoPE	Ministry of Population and Environment
MTEF	Mid-term Expenditure Framework
NCCIS	National Climate Change Impact Survey
NCCSP	Nepal Climate Change Support Programme
NDC	National Development Council
NLSS	Nepal Living Standard Survey
NPC	National Planning Commission
OAG	Office of the Auditor General
ODA	Official Development Assistance
PFM	Public Financial Management
PPP	Public-private partnership
RISMFP	Raising Income of Small and Medium Farmers Project
SEE	Secondary Education Examinations
SLC	School Leaving Certificate
UN	United Nations
VDC	Village Development Committee

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Executive Summary

Agriculture being one of the most vulnerable economic sectors to the impacts of climate change, the Ministry of Agriculture Development (MoAD) has been allocating substantial amount of its annual budget to implement programmes that help reduce farmers' vulnerability. Therefore, the share of climate-related budget of MoAD was about 20.8% of the total national climate related budget in 2013/14, when tracking of the climate-related budget began in the country. The high amount of climate-relevant budget is not a guarantee that it has reached the intended farmers and has helped them reduce their vulnerability. Therefore, this study, conducted by MoAD in collaboration with a civil society organization, focused on independent evaluation of the impacts of climate investments in agriculture with particular focus on poverty and gender.

Study objectives

The objective of the study was to provide the MoAD with a snapshot of the impacts of climate investments on the poor and vulnerable as well as of the current gaps in its delivery of climate investment both at the national and sub-national levels.

Methodology

This study reviewed agricultural programmes coded as climate-relevant in the national plan. The socioeconomic benefits of the climate-relevant programmes in the districts of Bardiya and Myagdi were assessed, particularly with respect to their benefits in terms of gender equality and poverty reduction. Programmes that the districts considered to be climate-relevant but which were not coded as climate-relevant in the national plan were identified in consultation with officials in the districts for assessment. The study team also reviewed the National Climate Change Impact Survey (NCCIS) to identify socioeconomic factors that contribute to climate change adaptation practices (CBS, 2016). Secondary information was collected through a review of the Nepal Living Standard Survey (NLSS), the NCCIS, the Red Book, national and district crop production data, climate-coded programme documents, and relevant technical and policy documents. Primary information was collected through consultations at the MoAD, Ministry of Finance, District Agriculture Development Offices, and group discussions and personal interviews with farmers' groups, cooperatives and individual farmers in the districts.

Findings and Recommendations

1. Public Finance Management

Expenditure as a percentage of the allocated budget declined on average from 97 percent to 87 percent between FY 2012/13 and FY 2015/16. This decline varied across activities. Expenditure increased for Agricultural Research and Development, Food Crisis Response, and Home Garden programmes but it did not for

others. The general delay in the release of the budget as well as increased out-migration were reason for under-performance. As such programme and project-level expenditures as a proportion of the total have slightly declined over the last two fiscal years.

Recommendation:

- There should be a public expenditure tracking system at the sub-national level to enhance the efficiency in the flow of climate finances.

2. Socioeconomic impacts on the Poor and Vulnerable

The socioeconomic impacts of climate-related investment in agriculture are clearly visible. The productivity of cereal crops has increased in programme areas compared to that in the district as a whole. The resilience of farmers has also increased, as they have begun multiple cropping, have greater access to improved irrigation facilities, plant drought- and flood-resilient varieties, manage local water more effectively, use organic fertiliser, and practice tunnel farming.

Feminisation of agriculture was observed in the study area as men had migrated in search of employment opportunities, with women left behind with increased workloads. Improving irrigation facilities helped women farmers to save time, earn more, and the resulting economic empowerment had increased their engagement in community organisations. Such positive impacts, however, are mostly coincidental; they are not outcomes of planning, programming and budgeting designed to reduce gender-specific climate change vulnerabilities. Climate investments have not been effective in introducing gender-friendly technologies that could reduce the agricultural workload of women.

Current climate-related programmes have failed to target the ultra-poor, the landless and the poor with very little land (the nearly landless), who live far away from service institutions.

Recommendations

- A mechanism must be in place to use the available vulnerability tools and assessments during planning and budgeting to increase the resilience of vulnerable populations for ensuring greater socioeconomic impact of the investments.
- The capacity of gender focal points should be enhanced to ensure that they propose gender-sensitive climate budgeting that could contribute towards addressing this shortcoming,
- These institutions at the local level should explicitly target the ultra-poor and ensure that they receive support to ensuring resilience to climate-induced disasters.

3. Factors Determining Resource Allocation and Institutional Mechanisms

The currently practiced farmers' group approach does not include the landless and nearly landless poor and other marginalised groups. Also the existing agriculture extension service does not communicate climate-related information to farmers, nor does it inform them of local research findings. There is very little vertical communication among agricultural institutions on climate-related issues, and this means that programmes need to focus on pro-poor and gender concerns at the implementation level. Further, the government's recommendations for crop varieties do not always match the particular geo-climatic conditions of the areas they are recommended for.

Recommendations:

- Build capacity of government officials at both the ministry and district levels to communicate climate concerns.
- Make clear provisions to ensure coordination between the gender and climate change focal points at the MoAD to consult on planning, programming and budgeting of climate actions.

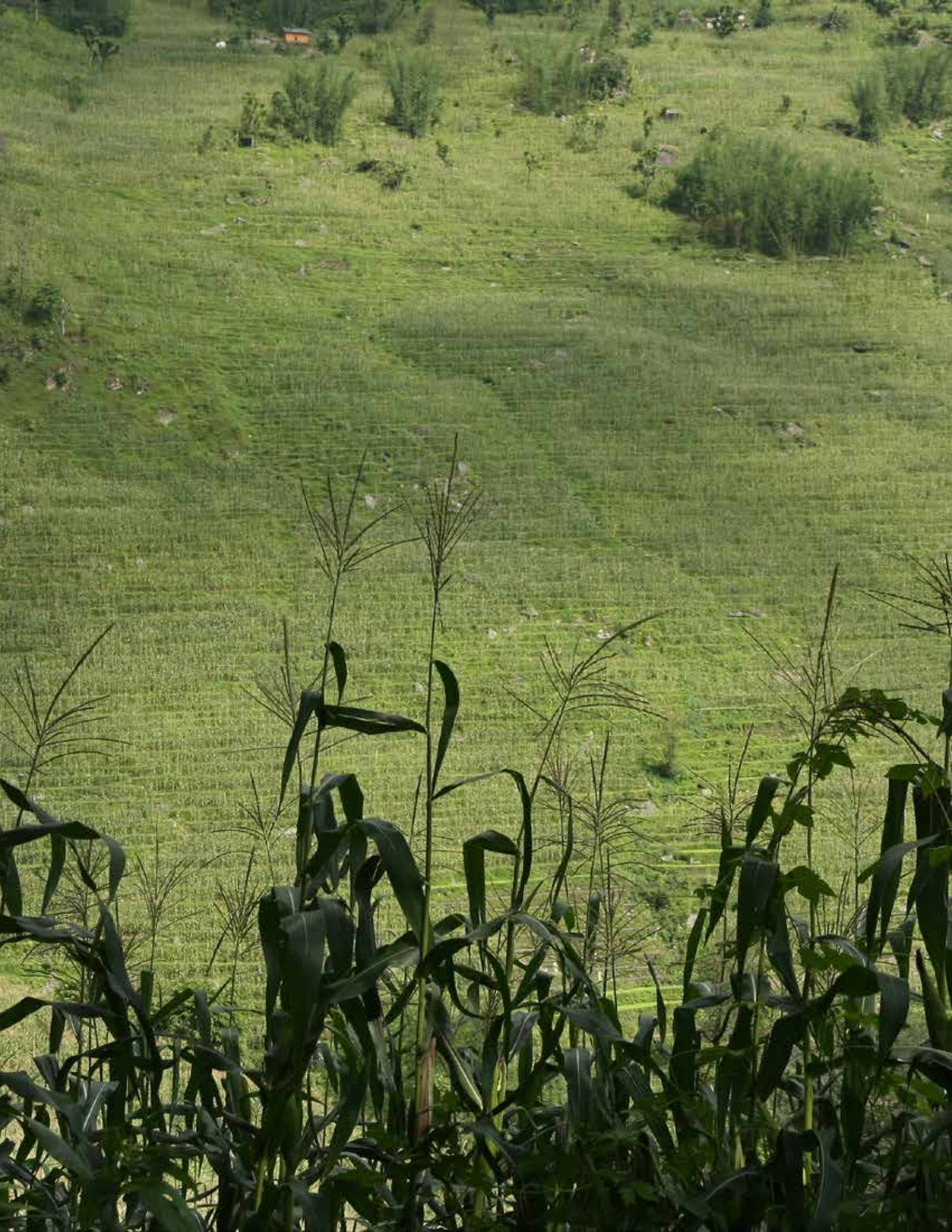
- There is a need to improve existing institutional mechanisms to ensure sharing of knowledge among federal, state, and local governments, while also improving the communication system.

4. Systematizing Vulnerability Assessments to Improve Budget Proposals

Agriculture plans are formulated without vulnerability assessments because the locally available information on vulnerability is scattered and seldom used for project identification, planning or implementation. There is a need for a data management system with variables like demographic information and shifts caused by climate change, an updated list of crop varieties, soil profiles, and how they have changed due to climate-related hazards like disease, flooding, drought, and storms.

Recommendation:

- Technical staff and officials at the sub-national level should be oriented on using vulnerability assessment tools and identify those who are unable to organise in groups and include them in participatory vulnerability assessments for improving budget proposals. They must ensure that the landless poor receive benefits from climate-related programmes.



1

Introduction

Background

This study is an analysis of the impact of the government's climate-related expenditure in the agriculture sector using primary and secondary sources. It is based on a review of agricultural programmes that were coded as climate-related in the national budget. In addition, the understanding and execution of climate expenditure was examined in two Mid-western districts Bardiya and Myagdi. The socioeconomic benefits of coded programmes in these districts were then assessed, particularly with respect to how they contributed to gender equality and poverty alleviation. Programmes that the districts considered to be climate-related but were not coded as such at the national level were also assessed. These programmes were identified in consultation with officials at the DADOs in both Bardiya and Myagdi. They included small irrigation projects launched as part of devolution, and programmes carried out under the LAPA. The study team reviewed the NCCIS to identify socioeconomic factors that contribute to climate change adaption practices (CBS, 2016).

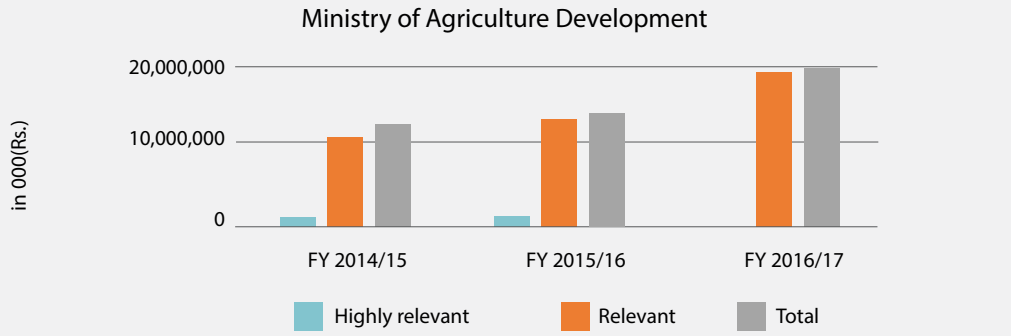
The GoN has recognised climate change as an area of public policy. In 2011, it initiated policies to integrate climate change across the sectors with the formulation of the Climate Change Policy. A year later, the development of the Climate Change Budget Code opened up opportunity to track climate change relevance in sectoral plans.

The National Planning Commission (NPC) introduced the Climate Change Budget Code in the FY 2012/13 for integrating climate-related programmes in the national budget. Eleven criteria determine whether or not a given public expenditure has climate relevance. These criteria have helped the MoAD develop a coding procedure to i) identify climate-related expenditure, ii) consider some development/capital costs as climate expenditure, iii) ensure that funds reach communities, iv) improve and simplify coordination at the centre, and v) harmonise support. The criteria have also helped the MoAD to identify the relevance of expenditures in key economic sectors. The code provides an opportunity to prioritise, allocate, and track expenditures, and their contributions to climate change adaptation and mitigation measures.

Agriculture is the mainstay of the economy: 70 percent of the active population is engaged in the sector that generates nearly one-third of the national gross domestic product (GDP). The GoN has prioritised agriculture in its periodic plans and annual development programmes, but these remain to be strengthened in terms of implementation. The majority of farmers, who are increasingly likely to be women as males have been migrating in search of more remunerative work, are poor and climate-vulnerable. The women workers' share in agriculture has remained significant and dropped only marginally as compared to male workers. Agriculture has already been adversely impacted

The National Planning Commission (NPC) introduced the Climate Change Budget Code in the FY 2012/13 for integrating climate-related programmes in the national budget.

Figure 1-1: Climate Related Budget in Agriculture



The 2015 Constitution of Nepal specifies that equality before and equal protection under the law is fundamental right of all citizens.

by climate change across all regions, ethnic, and income groups, and women and the poor are worst affected.

A large number of studies have suggested that the impacts of climate change are not gender neutral,[2] and that men and women are affected differently due to their gender roles. Moreover, women are affected more than the men.[3] Women constitute more than 60 percent of the agricultural labour force[4] and contribute to 60.5 percent of the agricultural economy.[5] Women also constitute the majority of the poor and this has limited their adaptive capacity, which is determined by an individual's access to and control over resources. Such access and control is limited among women in Nepal, especially the poor women.

The GoN has identified gender equality and women's empowerment as important pillars of national development. The 2015 Constitution of Nepal specifies that equality before and equal protection under the law is fundamental right of all citizens. It also allows the possibility of making special provisions to protect and empower socially and culturally backward populations.[6] The GoN has identified gender mainstreaming as an important tool for achieving its constitutional obligation of equality. It has adopted various general and sector-specific laws, policies and programmes, and has made institutional arrangements for facilitating the work towards equality. In the FY 2007/08, the GoN adopted the Gender-Responsive Budget Code with a view toward making public planning, budgeting and implementation gender-responsive for ensuring gender equality. Four years later, in 2012, it released the Gender-Responsive Budget Preparation Guideline to systematise the use of the code from the national to the local levels. The code and its guidelines enable the GoN to track gender-responsive public expenditure. Annexes 2 and 3 of the code provide indicators and sub-indicators to measure the gender-responsive planning and budget preparation of the MoAD.

This study had three main components. First, it explored the current gaps in, and strengths and efficiency of climate investments. It assessed whether or not climate investments in agriculture followed the budgetary allocations at the national and sub-national levels, and identified the key reasons for discrepancies. It

2 GGCa & UNDP. 2012." Gender, climate change and food security." Available at http://www.undp.org/content/dam/undp/library/gender/Genderpercent20andpercent20Environment/PB4_Africa_Gender-Climat-eChange-Food-Security.pdf; Also see, UN WomenWatch. 2009. "Women, Gender Equality and Climate Change." Available at http://www.wcdrr.org/wcdrrdata/uploads/854/Women_and_Climate_Change_Factsheet_UNWomenWatch.pdf ; Also see, FAO, et.al. 2012. "Gender and Climate Change Research in Agriculture and Food Security for Rural Development." Available at http://www.fao.org/docrep/015/md280e/md280e.pdf

3 UN WomenWatch. 2009. "Women, Gender Equality and Climate Change." Available at http://www.wcdrr.org/wcdrrdata/uploads/854/Women_and_Climate_Change_Factsheet_UNWomenWatch.pdf (Accessed on 1/22/2017). Also see. FAO, et.al. 2012. "Gender and Climate Change Research in Agriculture and Food Security for Rural Development." Available at http://www.fao.org/docrep/015/md280e/md280e.pdf (Accessed on 1/22/2017)

4 International Fund for Agricultural Development. 2013.'Enabling poor rural people to overcome poverty in Nepal.' Available at https://www.ifad.org/documents/10180/ c3f05a7f-627b-40a6-8bce-c3330c9849dc

5 ICIMOD, CICERO, et al. 2014. Women's Empowerment at the Frontline of Adaptation: Emerging issues, adaptive practices and priorities in Nepal. Available at http://lib.icimod.org/record/29811/files/WE_14.pdf

6 Article 18, Constitution of Nepal 2072. Available at http://www.lawcommission.gov.np/en/documents/2016/01/constitution-of-nepal-2.pdf

also examined climate-related activities on site at the ward, village, ilaka, and district levels. It also reviewed the local-level climate budget planning process and the climate change knowledge of the DADOs and the beneficiaries. The study has generated evidence of the socioeconomic benefits of climate investment on the poor and climate-vulnerable groups. This assessment was based on a field-level assessment of coded and non-coded programmes in Bardiya and Myagdi districts. The study has also assessed whether or not vulnerability of people and areas was taken into account during planning and resource allocation at the national and sub-national levels.

Rationale

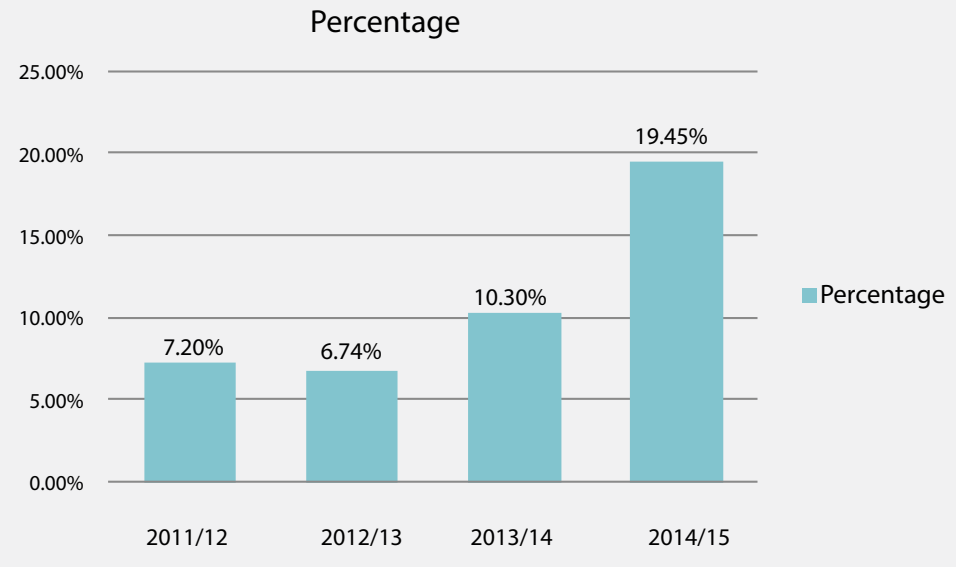
The GoN began using the Climate Budget Code systematically from FY 2013/14. This code identifies programmes as being either 1) relevant or 2) highly relevant to climate. The Climate Public Expenditure and Institutional Review (CPEIR) of Nepal served as a major incentive and contributed towards developing the budget code. The CPEIR identified expenditure on 83 climate change-related budget headings during the five-years from FY 2007/08 to the FY 2011/12 (CPEIR, 2011). On average, climate-related budgeted expenditure has been around 6.7 percent of annual government expenditure. The total allocation of the climate-related budget in agriculture has also significantly increased since then (Figure 1-2).

It is not enough to simply say that climate-related allocation in agriculture is increasing. It is also important to assess climate budget planning and allocation and track expenditure and its impact on the lives of people to see if the funds are having the anticipated effects. While the GoN does recognise the significance of climate change in agriculture, and the Climate Change Budget Code has helped the MoAD in tracking climate-related agricultural programmes since FY 2013/14, no study has been done to assess the socioeconomic impact of public climate investments in Nepal.

There is a need to understand and respond to the specific risks and vulnerabilities faced by men and women, and to allocate climate finance accordingly to address the disproportional impacts of climate change. As women and

The GoN began using the Climate Budget Code systematically from FY 2013/14.

Figure 1.2: Allocation of Climate Related Budget 2011/12-2014/15



men are impacted differently, their needs are different and thus, to be equitable and effective, interventions must be different. To measure whether or not climate-change interventions respond to gender-differentiated needs and equitable benefits, it is important to examine the impacts of climate change interventions from a gender perspective. Climate change exacerbates both the existing vulnerability of women, and the gender inequalities, thereby undermining women's adaptive capacities. It is impossible to achieve gender equality and justice in the context of climate change without adopting a gender perspective in public expenditure..

The broad objective of this study was to generate evidence of the performance of climate investment in agriculture and its impact on the poor and vulnerable.

Little is known about the socioeconomic implications of investments in climate-change activities in Nepal, especially for the poorest and most vulnerable people in the agriculture sector. This study was designed to fill that gap. Agriculture is one sector that is among the most vulnerable to climate change impacts, and the MoAD is a ministry that spends a substantial portion of the national budget for addressing the impacts. This study has examined the socioeconomic impacts of the climate-related agricultural investments. It has also measured the socioeconomic outcomes of climate investments, particularly in terms of gender equality and poverty reduction. It has also examined the evidences of interaction of the Climate Change Budget Code and the Gender-Responsive Budget Code, because overlaps could suggest the need by GoN to adopt an integrated and holistic approach to addressing the dual problems resulting from gender inequality and climate change.

Objectives

The broad objective of this study was to generate evidence of the performance of climate investment in agriculture and its impact on the poor and vulnerable. The findings of the study provide the MoAD with a snapshot of the gaps in delivery of climate investments both at the national and the sub-national levels, and also present conclusions about the impacts of climate investments on the poor and vulnerable. This study collected evidence from policymakers, planners, and implementers at the MoAD, NPC, MoF, and DADOs and used the information to analyse the intricate relationships of climate change financing, poverty, and gender. The findings can assist the MoAD in improving budget proposals and its ability to identify climate-related programmes at the district level. Specific objectives of the study were to:

a. Assess whether the identified climate investments in agriculture were spent as initially allocated (financial monitoring) and identify the key reasons for any discrepancies,
b. Assess the socioeconomic impact of public climate change investments (budget) and programmes on the poor and climate-vulnerable in the agricultural sector,
c. Analyse the factors that determine decisions about where resources are allocated and which institutional mechanisms facilitate those decisions, and
d. Make recommendations about how vulnerability assessments can be systematised and made available for improving budget proposals.

At present 11 different ministries have climate-change budgets. Therefore, the conclusions of this study may help other ministries with significant climate-related budget components to improve budgetary performances. There are conclusions on expenditure gaps, the different facets of climate change experienced by vulnerable groups, the socioeconomic impacts of climate change, and gender differentials regarding impacts of climate change investment.

2 Methodology

Conceptual Framework

Government Spending: Although the importance of the agricultural sector was reflected in early national planning documents, the sector was prioritised only in the fifth five-year plan (1975-80). The most recent 14th plan has also given it high priority in terms of budget allocation. However, the average growth of the sector from 1995 to 2010 was only 4.1 percent. In 2014, the MoAD formulated the Agricultural Development Strategy (ADS) envisioning "a self-reliant, sustainable, competitive, and inclusive agricultural sector that drives economic growth and contributes to improved livelihoods and food and nutrition security." The GoN has also developed many procedural documents for implementing the ADS and other policies.

The government's emphasis on the sector has had a positive impact on agricultural development by increasing the accessibility and availability of the means of production such as fertilisers, increasing the proportion of arable land irrigated, enhancing the productivity of major food crops, and expanding access to credit. These interventions have contributed towards raising the per capita GDP (Figure 1), increased employment, and reduced poverty significantly.

The agriculture sector is directly or indirectly exposed to exogenous climatic variables such as temperature and rainfall. Therefore, a significant proportion of climate investment is aimed at controlling or minimising the risks and negative impacts so that the desired level of profit can be obtained from agricultural activities.

To assess the impact of past climate-change investments in agriculture the study team chose the proxy indicator, per capita agricultural GDP (AGDP) as an impact variable. The AGDP can largely reflect the economic impact of past agricultural investments. Since the proportion of the total agricultural expenditure devoted to climate change-related spending was very small, its contribution to any increase in AGDP would also have been small. Without a proper data, however, it was not possible to measure the extent of the AGDP increase due to climate change financing. Poverty indicators are ideal for measuring the overall impact of government policies and investments, but these indicators are available only until 2011, in the NLSS. The impact of climate change finance at the central government level flows first to the district level, then to an agricultural service centre and finally, to users' groups or households. Thus, it is not just the budgetary allocation that is important but also the distribution process. This study assessed the gaps between allocation and spending at each step of the government structure: the central, district, and the service-centre levels. This study also reports on the socioeconomic benefits of climate change finance using case studies from Bardiya and Myagdi districts.

The most recent 14th plan has also given it high priority in terms of budget allocation.

The quantitative analysis focused mainly on assessing the socio-economic impact of climate investments using secondary data available from various government sources, including the NLSS and the NCCIS.

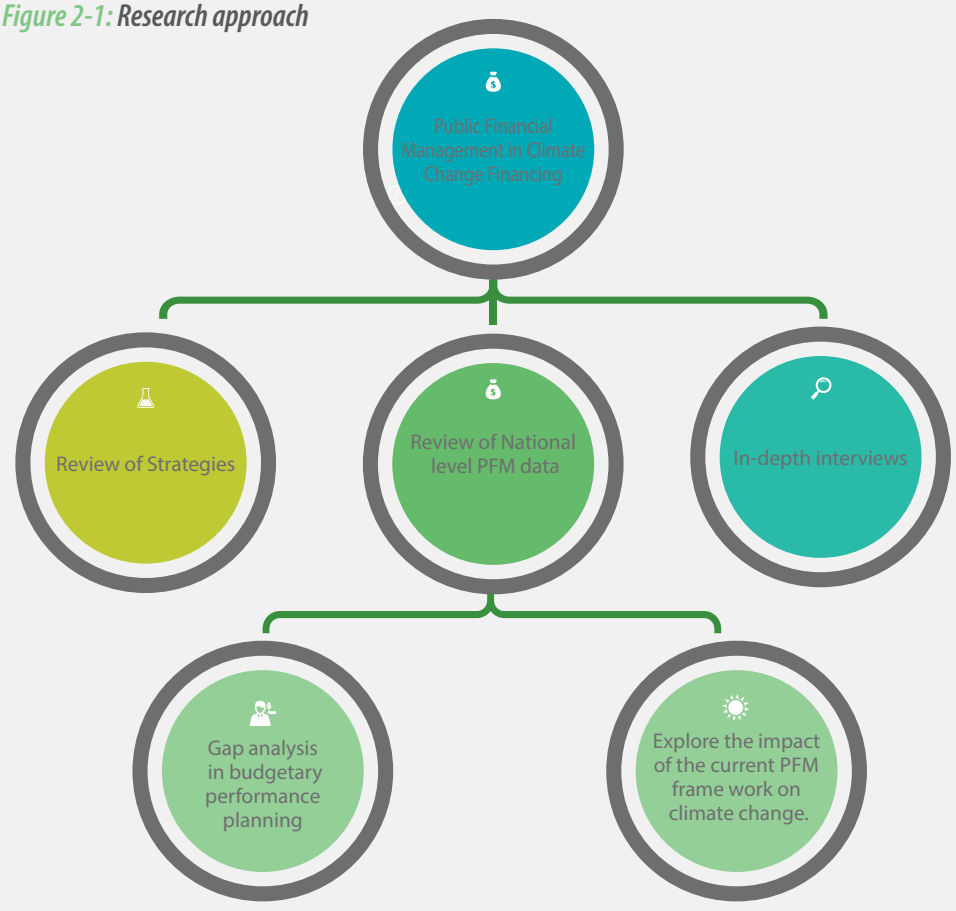
Research Approach: To fulfil the specific objectives listed above, the study team used both quantitative and qualitative methods, and analysed secondary and primary information using both qualitative and quantitative assessment tools.

The qualitative assessment consisted of collecting stakeholders' opinions at two levels. First, the study team collected opinions of both national- and sub-national-level stakeholders to explore their understanding, and the application of the climate-financing framework. This approach assisted the discovery of the procedural rigor with which climate funds were allocated, disbursed and spent. Second, the study team engaged with beneficiaries to develop an understanding of the socioeconomic impact of climate-related programmes by assessing the meanings that participants assigned.

The quantitative analysis focused mainly on assessing the socio-economic impact of climate investments using secondary data available from various government sources, including the NLSS and the NCCIS. The team also reviewed data on the public financial management (PFM) of Bardiya and Myagdi districts to draw conclusions regarding the gaps between the climate change expenditures planned and achieved. These data sources are used to describe and compare categories using simple graphs, percentages, and averages.

The study considered both poverty and gender perspectives in the analysis of public climate investments. The team reviewed PFM in climate change in order to assess governmental accountability with respect to the use of climate change-related investments and to analyse the impact of such investments on the poor and climate-vulnerable in the agriculture sector. The

Figure 2-1: ***Research approach***



team tracked the efficacy of public expenditure on climate investment in four ways:

Financial monitoring to analyse whether or not budget allocations were implemented in accordance with budget planning, and, if any discrepancies were detected, to identify the factors responsible for them,

Assessment of the impact of climate change on public programmes, especially on the climate-vulnerable in agriculture, particularly women and the poor,

Process monitoring to analyse the factors that determine how decisions regarding resource allocation are made and the nature of the institutional mechanisms underlying the decisions, and,

Derivation of policy implications using vulnerability assessments for later use in improving public budget proposals.

A simplified framework of analysis of climate finance was considered (Figure 2-1) while analysing climate-change policies, strategies, climate-change programmes, and climate data and statistics.

Data Sources

The data for this study came from secondary and primary sources. Using secondary sources like budget details, the red book and the budget speech, the study team was able to calculate the total national-level climate-change budget. Secondary data on national poverty was obtained from reports available at the Central Bureau of Statistics (CBS) and the MoAD. NCCIS data was used to assess the economic incentives for implementing various climate-change adaptation measures, incentives related to the avoidance of loss and damage from different climate-induced disasters like flooding, droughts, and fires. Primary sources of data included consultations with stakeholders, including beneficiaries, and observation. Consultations were held with stakeholders from the MoAD, MoF, DADOs, Agriculture Service Centre (ASC), farmers' groups and cooperative organisations. The study team solicited opinions on the following factors that directly or indirectly affect poverty and gender at various levels:

a. Access to markets for farm produce
b. Livelihood improvement
c. Productivity and production
d. Access to resources like insurance and credit, and
e. Empowerment in making decisions

Coverage and Selection of Districts

The study is based on a review of national and district-level statistical reports and case studies from Bardiya and Myagdi. It provides a national-level picture of the impact of climate investment in agriculture using conclusions drawn from several case studies from the sample districts. Bardiya was selected to represent the districts of the Terai (plains) where large-scale interventions are underway, and Myagdi was selected to represent the hill and mountain districts. It was also where the DCPEIR had been conducted. The implementation, scale and coverage of climate-related programmes implemented in the districts were assessed.

Assumptions and Limitations

Since no national-level data was generated after 2011, this study draws conclusions using national-level reports on agriculture, living standards, poverty, and climate done before that date. Since there was no regional- or district-level data disaggregated in terms of climate investment, the study turned to case studies from two districts to assess local impacts. The project did not assess opportunity costs. It did not also explicitly assess externalities associated with climate related projects.

3

Findings

Climate change Financing

There is no single internationally accepted definition for measuring climate finance, so Nepal came up with 11 criteria to assess climate-change relevance in its budget. This study assessed climate-change expenditure of the MoAD using the same criteria (listed below).

i. Sustainable management of natural resources and promotion of greenery
ii. Land-use planning and climate-resilient infrastructures
iii. Prevention and control of climate change-induced health hazards
iv. Prevention and control of climate change-induced hazards to endangered species and biodiversity
v. Management of landfill site and sewage treatment for the reduction of Green House Gas (GHG) emissions
vi. Sustainable use of water resources for energy, fishery, irrigation, and safe drinking water
vii. Plans and programmes supporting food safety and security
viii. Promotion of renewable and alternative energy, and development of technology to reduce emissions and promote low-carbon energy use
ix. Preparedness for climate-induced disaster risk reduction
x. Generation of information, education, communication, research and development, and development and updating of databases, and
xi. Preparation of policies, legislation and plans of action related to climate change

In the absence of the initiatives included in the 11 criteria above, farmers' access to working capital (short-term loans) and, more importantly, to investment capital (long-term loans) will be limited and this impedes their ability to invest in infrastructure. In many developing countries, the proportion of climate-smart investments in the overall public sector budget is not clear. Only the Official Development Assistance (ODA) support database is efficient to reflect this information.

In many developing countries, the proportion of climate-smart investments in the overall public sector budget is not clear.

Process of Climate Financing

The government relies on a number of financial and institutional arrangements to mobilise and manage climate finance. Its periodic plans prioritise and allocate resources to sector-specific programmes and budgets. These are integrated in a mid-term expenditure framework (MTEF). In following the MTEF, each ministry must consult with the NPC and the MoF, which coordinate activities with reference to the periodic plan and annual government budget, respectively.

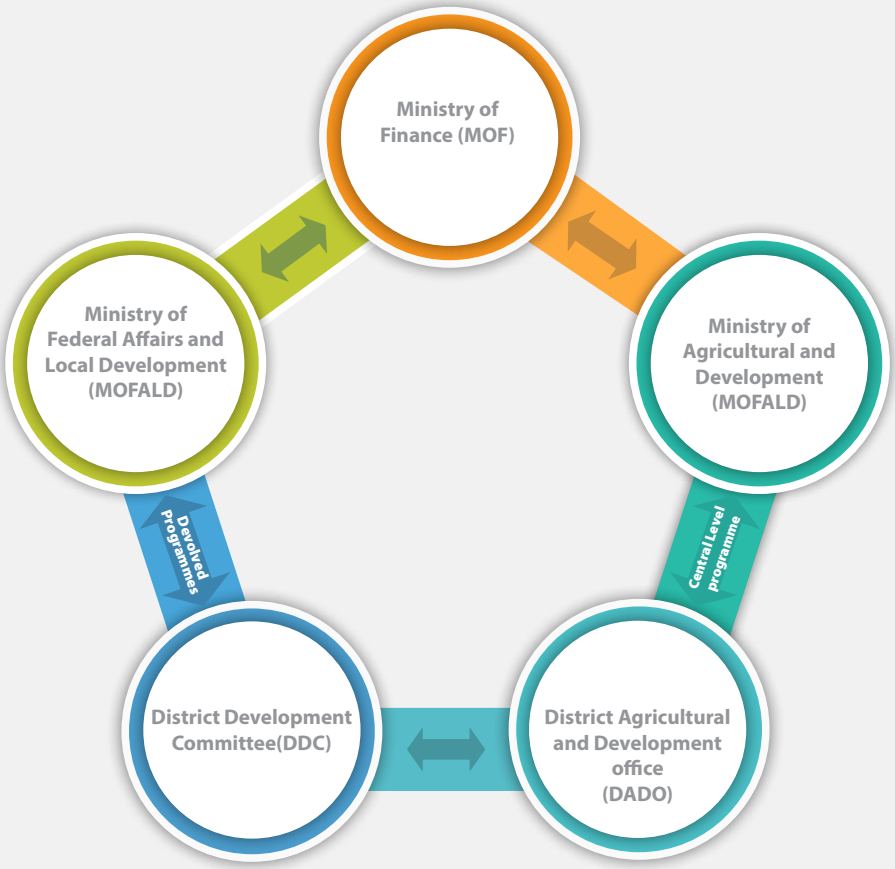
Nepal is in the process of finalising a Climate Change Financing Framework (CCFF) that aims to integrate climate finance-related

The budget process of the NPC/MoF incorporates both top-down and bottom-up approaches.

policies and strategies in the budgetary process by converging top-down policies and strategic guidelines with bottom-up planning. This convergence is expected to help inform decision-makers about the impacts of budget decisions on climate finances before the allocations are made. The proposed CCFF serves as a roadmap for taking measures at various stages in the budget cycle. It envisages that the NPC would increase its responsibility for coordinating and harmonising climate financing by providing policy guidance to line ministries and local bodies to ensure that they can fulfil the national commitment of allocating at least 80 percent of the climate change budget to local spending. Once the CCFF is in place, the MoF will allocate budget in line with the MTEF to climate change-related programmes and projects, and the Ministry of Population and Environment (MoPE) will monitor implementation and analyse the impacts of climate change on the economy. The Ministry of Federal Affairs and Local Development (MoFALD) will update the existing Resource Mobilisation Guidelines for Local Bodies to align it with the climate change policy. The CCFF will also support the Office of the Auditor General (OAG) for carrying out performance audits.

The budget process of the NPC/MoF incorporates both top-down and bottom-up approaches. The NPC, National Development Council (NDC), MoF and MoAD all play a role in the planning and budgetary processes. In Nepal, climate-change budgeting for agriculture works through two channels to support farmers (figure 3-1): central-level programmes and through the mechanisms of devolution.

Figure 3-1: Climate-Change Budget Flow Mechanism at the District Level



The budgetary process begins when the NPC's Resources Committee releases a budget estimate for the new fiscal year. The MoF works to manage the public sector revenue and expenditures. The DADOs implement both central-level and devolved programmes through ASCs and farmer's groups.

Trends in Climate-Change Financing in Nepal

Nepal's public sector started assessing and tracking the climate change budget in FY 2013/14. The MoF classifies the climate-change budget into "relevant" and "highly relevant" expenditure in addition to its climate change-neutral budget. Each of these categories is subdivided into recurrent and capital expenditures.

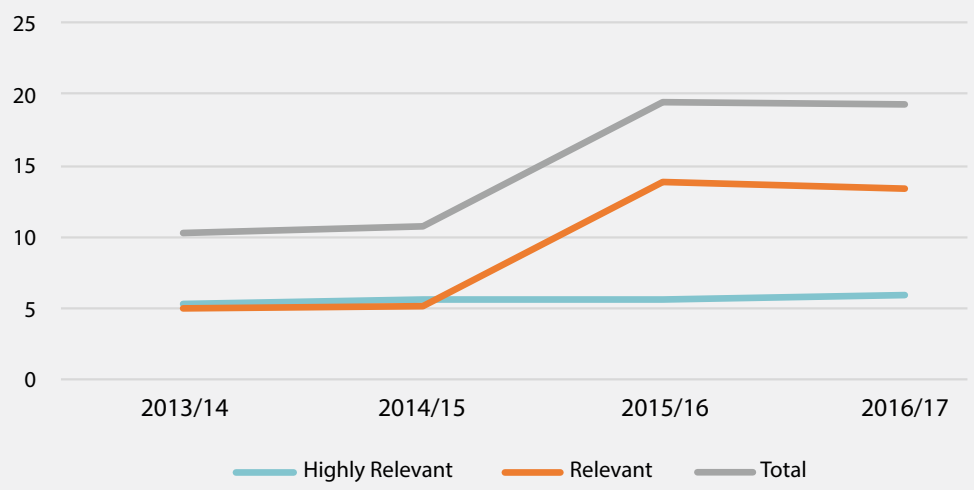
The total climate change budget was approximately 10 percent of all public expenditure in FY 2013/14 and increased to about 20 percent in the FYs 2015/16 and 2016/17 (Figure 3-2). In FYs 2013/14 and 2014/15, the highly relevant and relevant allocations each constituted about half of the total. In the following FYs (2015/16 and 2016/17), however, the proportion of the climate relevant budget was more than double of the highly relevant proportion. This gap widened even more in the case of the agricultural climate-change allocation, as explained below.

From FY 2013/14 to FY 2016/17, the relevant climate-change budget in agriculture comprised 90-98 percent of the total compared to less than 10 percent for highly relevant allocation (Figure 3-3). During the same period, the recurrent allocation declined from 92 percent of the total budget to about 87 percent, and capital budget increased from seven percent to about 13 percent. The growth in the capital allocation mainly took place under the relevant climate-change budget rather than highly relevant budget.

The rising share of public capital expenditure compared to recurrent spending in agriculture reflects the gradual rise in productivity of agricultural crops. This rise could pave the way for the commercialisation of agriculture, but field-level evidence in Bardiya district reveals that most of the capital expenditure was hardly contributing to productive activities, rather it had been spent on office dwellings/equipment and other accessories. Most capital expenditure

The MoF classifies the climate-change budget into "relevant" and "highly relevant" expenditure in addition to its climate change-neutral budget.

Fig. 3-2: Climate change budget in Nepal (% of total expenditure 2013/14-2016/17)



The rising share of public capital expenditure compared to recurrent spending in agriculture reflects the gradual rise in productivity of agricultural crops.

relates to official expenses such as the extension of buildings, construction of walls, purchase of motorbikes, computers, and laptops, the repair and maintenance of office quarters and other similar activities. Only a small proportion of capital expenditure was spent on small irrigation projects that were directly relevant to the expansion of productive capacity.

Climate-Change Financing: The Local Context

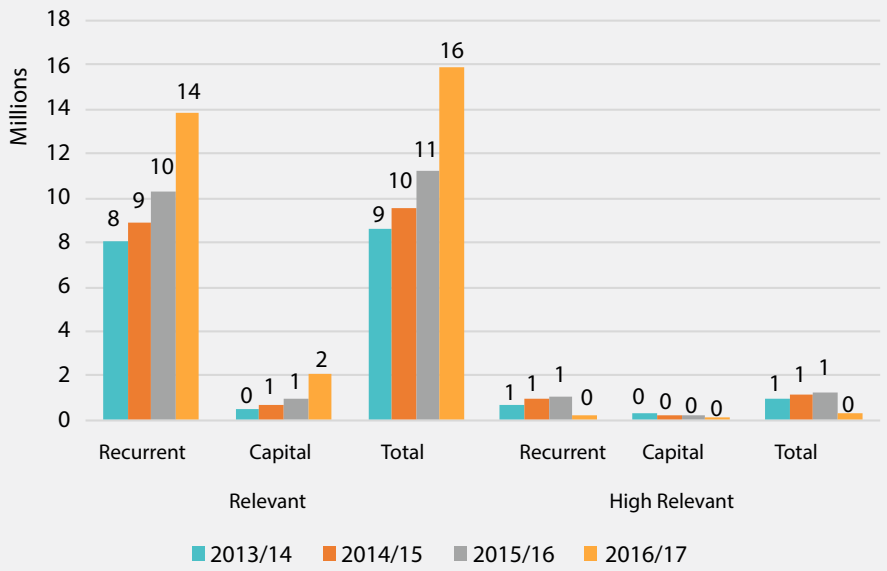
It is essential to consider some of the fundamental governance issues related to climate and agriculture investments for inclusive and sustainable growth. Property rights and secure land tenure are essential building blocks for inclusive agriculture development. Investments need to be responsible, respect the rights of local people, and maximise development impact. This requires using the Voluntary Guidelines for the governance of land tenure, fisheries and forests for supporting responsible investments.

Devolved programmes are of two types. LAPAs under the Nepal Climate Change Support Programme (NCCSP) are implemented directly by the District Development Committees (DDCs) that determine beneficiary selection and fund flow. The DADOs only provide technical assistance. The DADOs directly manage another type of devolved programmes, but the DDCs need to approve them. Other programmes are formulated at the centre. In such programmes, such as the Prime Minister's Agriculture Modernisation Programme, the MoAD provides fund to the DADOs directly.

Discrepancies between Budget Allocation and Expenditure

At market prices, climate-change expenditure increased by 24 percent between the FY 2014/15 and the FY 2015/16. However, when the approximately 10 percent rate of inflation is considered, that growth declines to 14 percent. Furthermore, Table 3-2 shows that there was a dramatic decline in the climate-change expen-

Fig. 3-3: Trend of Agricultural Climate Change Allocation during 2013-2017 (in Rs.)



diture of three key ministries: industry, energy, and tourism. Variations in the two years were minimal for other ministries. Overall, the climate-change expenditure performance of the GoN improved marginally, from 72.84 percent to 74 percent of the proposed expenditure, but that of the MoAD's share declined slightly, from 89 percent to 87 percent.

Further disaggregation of climate-change expenditure patterns for the agricultural sector in FYs 2013/14 and 2015/16 reveals that central-level expenditures (those by the MoAD and its departments as well as development boards) to establish a development fund and conduct monitoring and co-ordination activities have increased. However, in relative terms, the programme and project-level expenditures have declined. In particular, the Special Programme for Agricultural Production, Area-Specific Agricultural Development Project, Sericulture and Horticulture Development Programme, Potatoes, Spices, and Vegetables Development Programme, Agriculture Extension and Development Programme, Agri-Business Promotion and Market Development Programme, Co-Operative Farming and Small Irrigation, Commercial Agriculture and Trade programme, Sustainable Soil Management Project, and Improved Seed for Farmers Programme all had lower budgets allocated in FY 2015/16 compared to FY 2013/14.

Expenditure on agricultural development programmes has not improved. In fact, as Annex Table 6.2 shows, it declined from 97 percent to 87 percent from FY 2012/13 to FY 2015/16. The decline varied across activities. Spending on the Agricultural Research and Development Programme, Food Crisis Response Programme, and Home Garden Programmes did improve but that for others listed above did not. There are several reasons for this. The MoAD explained it from a demand-side perspective: 'the proportion of the population in agricultural activities has declined and the migration of the labour force has continued, and therefore the spending has declined'. DADO offices, in contrast, explain the decline from a supply-side perspective: 'delays in the release of the proposed budget by the ministry mean that districts are unable to spend all the allocated funds because the procurement process is long. This problem is especially acute in case of the last-quarter tranche as three months are not long enough to be able to spend while abiding

Overall, the climate-change expenditure performance of the GoN improved marginally, from 72.84 percent to 74 percent of the proposed expenditure, but that of the MoAD's share declined slightly, from 89 percent to 87 percent.

Table 3-1: Capacity Gap in Expenditure by Ministry for FY 2014/15 and FY 2015/16

	FY 2014/15		FY 2015/16	
Ministry	Total budget (in millions of Rs.)	Total expenditure (% of budget)	Total budget (in millions of Rs.)	Total Expenditure (% of budget)
Industry	7.27	92.41	343.15	2.19
Energy	1755.35	44.14	5540.53	14.11
Agricultural Development	10551.81	89.24	12463.56	86.93
Tourism	227.70	10.00	374.85	0.00
Forest and Soil Conservation	5770.56	65.53	7647.84	64.72
Science, Technology, and Environment	7317.72	61.62	7778.21	65.17
Physical Planning and Transportation	2327.91	68.29	2411.57	77.39
Urban Development	13879.95	72.99	14218.88	91.07
Education	469.80	68.96	667.01	90.37
Irrigation	13920.25	85.83	16385.56	99.33
Federal Affairs and Local Development	3876.27	56.94	5220.58	59.11
Finance	9280.00	62.78	12295.00	54.80
Total	69384.57	72.84	85346.73	74.00

The climate change budget is allocated to different projects and programmes designed to address several aspects of agriculture development.

by the public procurement rules. There needs to be closer consultation between the MoAD and DADO offices to overcome this shortcoming. Expenditure can be improved through revisions of the budgetary guidelines, and mid-term reviews of the quarterly budget by the DADOs.

The climate change budget is allocated to different projects and programmes designed to address several aspects of agriculture development. The MoAD classifies highly relevant and relevant climate-related activities as shown in Table 3-2.

At the district level, the DADOs implement programmes to fulfil the local needs of farmers. Table 3-3 shows the climate-change programmes that were functioning in Bardiya district during the study.

Budgetary gap at the district level

Field-level evidence suggests that budgetary gaps – discrepancies between proposed and actual expenditures – were not a problem in both Bardiya and Myagdi districts. This is because the climate-change budget was a very small proportion of the overall agricultural development budget and also because both districts had several climate change projects on which they can spend their allocations. Arguably, discrepancies do appear in some circumstances because of delays in releasing budgets from the ministry rather than due to lack of absorptive capacity of the districts. For example, in case of devolved activities, the DADOs and DDCs must work together in coordination with the ministry to spend the allocated budget, but the ministerial release of the last quarter's budget at the very end of the fiscal year makes it almost impossible for them to use the budget within that fiscal year because the short spending timeframe. This problem is exacerbated by the fact that public-sector expenditure, especially capital expenditure, entails a long procurement procedure and this is why more than two-thirds of all public-sector budgets are spent in the last few months of the fiscal year.

Climate-Change Investment and Its Socioeconomic Impacts

Socio economic Impacts

According to the NLSS, the percentage of households having their own land has decreased since FY 1995/96 from 83.1 percent to 73.9

Table 3-2 :Climate-Related Programmes under MoAD

	Highly relevant		
1.	Agricultural Research and Development Fund	4.	Food Crisis Response Programme
2.	Integrated Water Resources Management Plan (IWRMP)	5.	Sustainable Land Management Plan
3.	Livestock Development	6.	High Hill Agricultural Businesses and Livelihoods Improvement Plan
	Relevant		
1.	Special Agricultural Development Programme	9.	Food, Nutrition and Technology Programme
2.	Raising the Incomes of Small and Medium Farmers Programme	10.	Crop Protection Programme
3.	Agriculture Development Plan	11.	Crop Development Programme
4.	Resham Plant Development Plan	12.	Community-Managed Irrigation in the Agricultural Sector Programme
5.	Horticulture Development Plan	13.	Special Agricultural Development Programme
6.	Potatoes, Spices, and Vegetables Development Plan	14.	Home Orchard Programme
7.	Seed Promotion and Quality Control Programme	15.	Prime Minister's Agricultural Modernization Project
8.	Fisheries Development Programme	16.	Nepal Agricultural Services Development Programme

Source: Red book, Ministry of Finance

Table 3-3 : Climate-Related Programmes Implemented in Bardiya

Highly climate-relevant	
IWRMP	
Climate-relevant	
Home Orchard Programme	Fishery Development Programme
Prime Minister's Agricultural Modernisation Project	Crop Development Programme
Horticulture Development Programme	Raising the Incomes of Small and Medium Farmers Programme
	Small Irrigation Project (not coded)

percent in FY 2010/11. This indicates that more than nine percent households have no access to land, which, in the Nepali context, is a vital asset a household would require to escape from poverty and vulnerability.

Irrigation is an important factor of production; one that plays a crucial role in increasing crop productivity and helps in reducing climate-related risks (such as too much or too little rainfall) to yields. Irrigation is an important adaptation strategy for coping with climate change. Having access to irrigation facilities can increase a farmer's income and resilience but Nepal has not made much progress in increasing the proportion of irrigated land. The 2011 NLSS report shows that 55 percent households have access to irrigation facilities, meaning that nearly one-half of the households do not, and are therefore dependent on rainfall that exposes them to climate-related risks. The more land a household has, the greater is its capacity to cope with climate change. However, the average holding of arable land decreased by more than one-third from 1.1 ha in FY 1995/96 to 0.7 ha in FY 2010/11. The average number of parcels of land has also decreased, signalling that, on average, households have less land than they did in the past. By FY 2010/11, almost 53 percent of households farmed on less than 0.5 ha, and the proportion of farmers cultivating rented land increased from 4.8 percent to 5.4 percent from FY 1995/96 to FY 2010/11.

While the percentage of households raising poultry increased slightly, from about 50 percent to 54 percent, the proportion of households growing paddy and raising cattle have declined (Table 3-4). The sharp increase in the percentage of households that cultivated summer vegetables indicates that farmers are turning their attention towards profitable or commercial farming and away subsistence farming.

Climate-Change Investment (Rs. '000) vs. Productivity (Kg/Ha) of Major Crops: The ultimate goal of government expenditure in the agricultural sector is to increase overall productivity. As an integral part of agricultural investments, climate-change investments seek to increase the productivity of vulnerable crops, particularly by adapting against the negative impacts. Figure 3-4 correlates climate-change investments with the overall yields of Nepal's major crops. Figure 3-4 also illustrates the relative growth of both relevant and highly relevant climate-change investments associated with each yield. While climate-change finance has increased steadily, cereal yields have fluctuated, oilseed yields have remained steady, and pulse yields have increased slightly. Although a number of factors, including exogenous variables like temperature and rainfall, are at play in determining crop yields, it is quite plausible that there is a relationship between climate-change finance and the yields of various crop types, because yields reflect the relative success or failure of investments in agriculture. However, the ratio of climate-change finance to total agriculture investment is nominal, and within climate-change finance the proportion allocated to capital expenditure is very small. For these reasons, the allocated climate change finance is too small to have a

Irrigation is an important adaptation strategy for coping with climate change.

The ultimate goal of government expenditure in the agricultural sector is to increase overall productivity.

visible impact at the national level. However, at the sub-national (district) level, climate-related projects have had visible socioeconomic impacts on the lives of the poor and vulnerable.

Access to facilities: Improvements in facilities increase the capacity of farmers to cope with the negative consequences of climate change. The percentage of households with access to open air markets (haat bazaar) increased by 33 percent between FY 1995/96 and FY 2010/11 (Table 3-5). In the same period, the proportion of households with access to cooperatives and agricultural centres increased by 28 percent and 19 percent, respectively. Improvements in access to financial institutions such as cooperatives offer farmers the opportunity to obtain credit to invest in their farms, and increased access to agricultural centres increases awareness and information about various government schemes and technologies to promote agriculture. This data (Table 3-5), however, is not disaggregated and does not provide percentage change in terms of access to poor and vulnerable households that have received such services.

Access to infrastructure: Improved access to infrastructure enhances people's ability to cope and even bounce back more resilient after a climate-induced disaster. Over the last 15 years, increases in the proportion of households with access to infrastructures and services, including roads, markets, irrigation, banks and agricultural service centres have varied (Table 3-6). However, the proportion with access to agricultural service centre and irrigated land remains small. Moreover, there is no evidence to show that the poor and vulnerable have benefited.

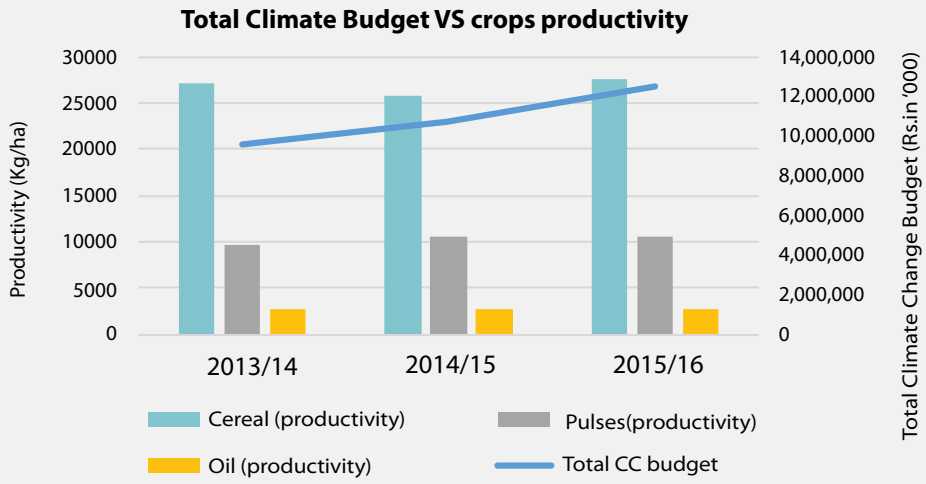
Agricultural GDP per capita: Nationally, government expenditure in the agricultural sector increased sharply from 1996 to reach nearly Rs. 55 million in 2002, at which point it declined to below Rs. 30 million in 2007 (Figure 3-5). The agricultural expenditure rose again reaching nearly Rs. 40 million in 2010. Then after a slight decline in 2011 it increased to over Rs. 52 million in 2012. The main reason for the decline in expenditure between 2002 and 2007 was low allocation to the sector. The government's priority was fighting the Maoist insurgency that caused defence spending to increase. Agricultural expenditure increased significantly after the signing of the peace agreement. The AGDP increased continuously from FY 1996 to FY 2012 (though not by much) and it is likely that some part of the increase was made possible by the climate-related investment in agriculture, and a favourable policy environment (CPEIR, 2011). However, it is difficult to demonstrate the specific impact of climate-change investments on the poor and vulnerable.

Table 3-4: Facts about Landholdings and Crops Cultivated from the FY 1995/96 to the FY 2010/11

Description	NLSS		
	1995/96	2003/04	2010/11
Agricultural households with land (% of total households)	83.1	77.5	73.9
Percentage of agricultural land which is irrigated	39.6	54.3	54.4
Average size of agricultural land (in ha)	1.1	0.8	0.7
Average number of parcels	3.8	3.1	2.9
Households farming less than 0.5 ha (% of total holdings)	40.1	44.8	52.7
Percentage of holdings operating renting-in-land only	4.8	7.3	5.4
Percentage of holdings growing mainly paddy	76	76.1	72.3
Percentage of holdings growing mainly summer vegetables	35.6	60.8	68.8
Percentage of holdings with cattle	73.5	66.6	64.2
Percentage of holdings with poultry	49.9	52.7	53.6

Source: CBS-NLSS, 2011

Figure 3-4: Climate-Change Investment versus the Total Yields of Major Crops



Field-basedassessment: During consultations with district-level agricultural authorities and local extension workers, the research team gathered information on public sector spending procedures. Most officials were not adequately informed about the climate change budget code that they were supposed to be following while spending their annual allocations. In terms of expenditure, climate-related projects are implemented in the same way as other projects. For this reason, it is hard to draw conclusions about climate change expenditure. Officials at the DADOs have not been oriented or trained on climate-related budgeting. Many did not even know that a climate code existed in the national budget. District-level stakeholders need support to enhance their understanding of climate change, its impact on agriculture as well as ways to mitigate the impacts, and for incorporating the knowledge in climate-related project planning, formulation and implementation.

Assessment of selected climate-relevant agricultural programmes

a. The Home Garden Programme is coded as a pro-poor, gender-inclusive, and climate-relevant programme. Its objective is to ensure nutritional security of households by getting them to plant vegetables in their backyards. The DADO implements this programme. The study team asked participant households about the programme's activities, process, criteria to participate, and possible impact on beneficiaries. These interviews revealed that the groups that were very active had received inputs such as seeds and technical support from the government. The local extension officers distributed seeds to the participating households. However, there were no criteria to ensure that the poor, women and the climate-vulnerable benefited. The beneficiaries were diverse in terms of landholding and family size. Since the programme had just started and crops were still growing, it was not possible to assess

The percentage of households with access to open air markets (haat bazaar) increased by 33 percent between FY 1995/96 and FY 2010/11

Table 3-5: Increases in Access to Facilities between FY 1995/96 to FY 2010/11(% of Total Households)

Access to Open air market (haat bazaar)	33%
Access to cooperatives	28%
Access to agricultural centre	19%

Source: NPC 2013.

Table 3-6: Increases in Access to Infrastructure (% of Households)

Facility	1995/96	2010/11
Agricultural service centre	25%	43%
Commercial bank	21%	40%
Market centre	24%	45%
Road for vehicles	58%	80%
Electricity	14%	70%
Irrigated land (% of total)	40%	55%

Sources: CBS-NLSS, 2011

The main reason for the decline in expenditure between 2002 and 2007 was low allocation to the sector.

the social impact of the programme. However, the DADOs did promote the use of organic pesticides made from locally available plant such as titte pati. Such use of local resources decreases dependence on chemical pesticides and increases healthy agricultural practices. The vision of the newly established Thakurdwara Municipality in Bardiya to become a pesticide-free area also helped in the process. Generally, the programme promises to be able to address the food and nutritional security[7] of families round the year, and help them to save money on groceries.

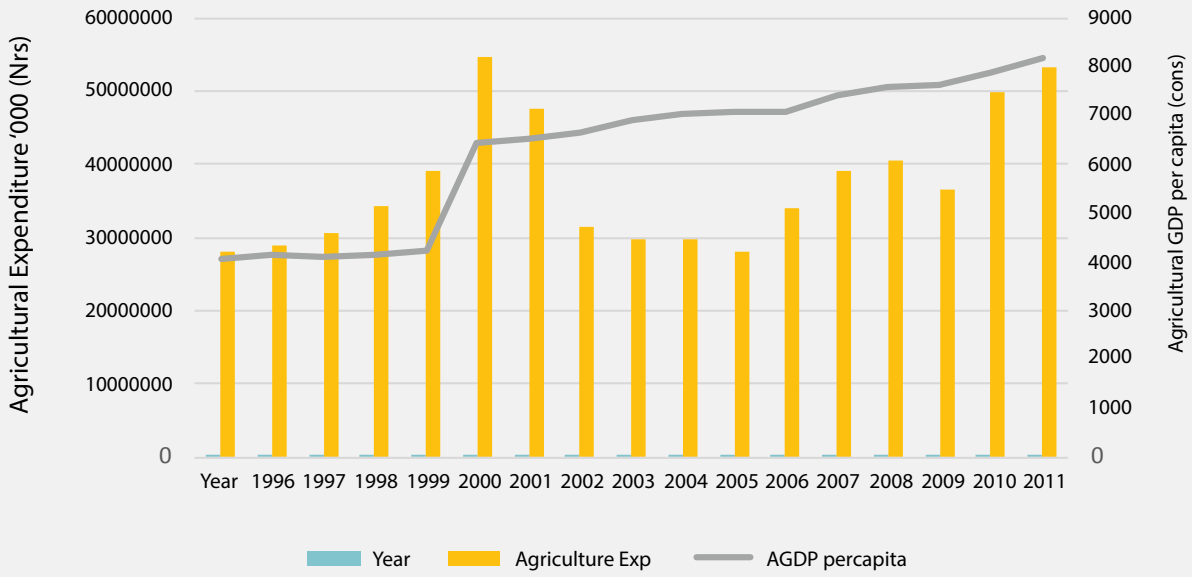
b.Integrated Water Resources Management Project (IWRMP): The Integrated Water Resources Management Project is a central-level project with climate-relevant, gender-inclusive, and poor budget codes. The study team visited Pratappur in Bardiya, the target community, for interactions and information collection. The observations are discussed below:

i. Major activities and processes:

- Funded by the GoN and the World Bank
- Established an irrigation channel in Babai-1, Neulapur
- Formed a water users' committee
- Formed various groups under that committee
- Coordinated with the Irrigation Division, the District Agricultural Development Committee, and the Agricultural Development Bank
- DADO supported farmers' group formation and implemented its programme through the groups
- The Agricultural Development Bank provided agricultural credit, and
- IWRMP subsidised 85 percent of the cost of machinery.

ii. Major impacts observed: In Bardiya, the proportion of irrigated land has increased to 225 ha of the total 235 ha (IWRMP project document), and both the production and productivity of major crops increased substantially. The cropping intensity also increased by 150 percent to 220 percent as the number of crops cultivated each year increased from 200 percent to 300 percent. Access to new and better quality seed varieties also increased substantially, and the benefit-cost ratio decreased for all crops except wheat. On average, household income increased from Rs. 8,500 to Rs. 12,000 per month. Further, the households were more likely to use new technologies, engage in commercial activities and mechanise agriculture more than they did in the past. Food security improved due to the increases in production and income. Since production had increased, farmers had begun to think of using organic pesticides and had become more health-conscious. Although almost half of the households depended on agriculture; other respondents were involved in businesses and wage labour. People in the village had also gone abroad or to other parts of Nepal in search of work. Since women maintained the irrigation canals as men also sought alternative sources of income away from home. This, however, had increased the workload of women. With the time locals were able to save as a result of the project, some households were able to start up and engage in other activities, such as fish farming and off-seasonal vegetable cultivation. Farmers now had more knowledge about and access to, and could also afford, new technology. For example, some had bought zero-tillage machines for planting wheat and lentils. Around 20-25 affluent households had their own pumps because their land was located at higher

Figure 3-5: Government Agricultural Expenditure ('000 Rs.) vs. Agricultural GDP Per Capita



elevation than the irrigation canals. Children also had more access to schools. In fact, most studied at private, English-medium schools. Older children attended college. More students had begun taking the national qualifying exam after grade 10, the Secondary Education Examinations (SEE), compared to those who used to take its equivalent, the School Leaving Certificate (SLC), earlier. People had invested more in education and also saved more money. The beneficiaries also said that they were more aware of and had better access to health services. Further, social cohesiveness had increased, as people were involved in various community groups, like farmers' and savings-and-credit groups.

iii.Findings based on district and project-level crop data in Bardiya: Crop productivity in Bardiya district is illustrated in Figure 3-6. The productivity of paddy was almost stagnant until 2009/10, but increased to about 4.5 Mt/ha in 2011/12. Then it fell to 3.5 Mt/ha the following year and rose only slightly thereafter. The productivity of maize fluctuated between 2.0 and 2.5 Mt/ha, and that of wheat steadily increased from 2005/06 to 2013/14, and after a decline in 2007/08, had approached 3.7 Mt/ha. These rates are compared with project-level productivity data in figures 3-7 (paddy), 3-8 (wheat), and 3-9 (maize).

iv.Impact on paddy productivity: Figure 3-7 demonstrates that the gap between the district average and the project area average has declined over the years, suggesting that farmers in the project areas have benefited from increased access to irrigation facilities, adoption of new crop varieties (including high-yielding varieties), and access to new technology, machinery, fertilisers, and other inputs.

v.Impact on maize productivity: Figure 3-8 shows that, in contrast with the declining district average, the productivity of maize increased sharply in the project area and, since 2008/09, at least, it has been higher than the district average. Irrigation, technology, crop variety, and fertiliser were major reasons for the increase.

The vision of the newly established Thakurdwara Municipality in Bardiya to become a pesticide-free area also helped in the process.

[7] According to the Food and Agriculture Organization, food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.

The cropping intensity also increased by 150 percent to 220 percent as the number of crops cultivated each year increased from 200 percent to 300 percent.

Impact on wheat productivity: The gap between the average wheat productivity of Bardiya and that of the project area declined slightly after the project interventions. Although productivity in the project area has fluctuated over the years, the overall trend is upward and approaching the district average (Figure 3-9).

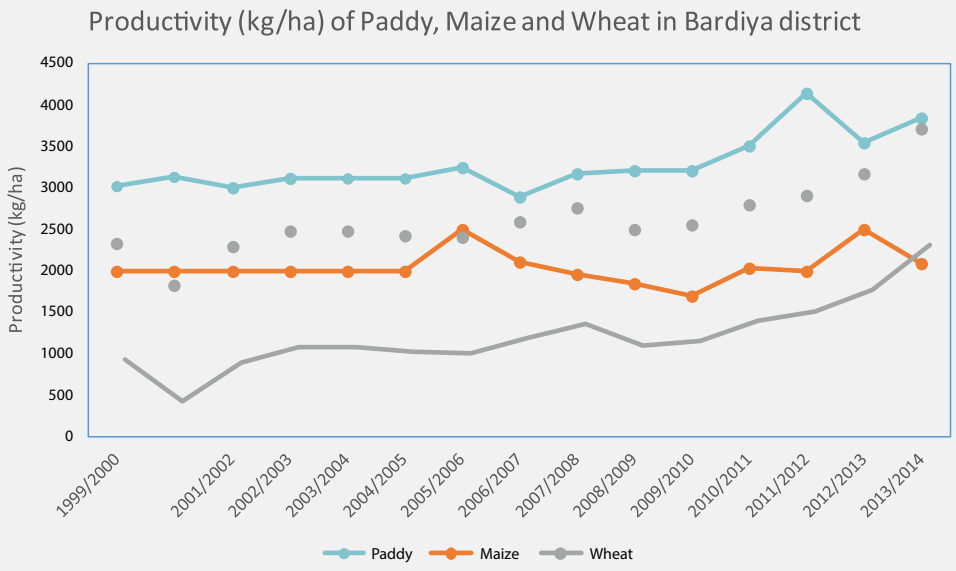
Adaptation to Climate Change Impact in Bardiya

i. Discussions with Bardiya DADO and farmers, and field observations revealed that climate change had a visible effect in the district. The community's perceptions of climate change effects are presented in

ii. Climate change, fluctuations in market prices of inputs and outputs, trans-boundary diseases, and natural disasters have had major local and regional impacts on agriculture. India has developed agricultural insurance and disaster response mechanisms for primary (crop failures) and, to some extent, secondary (livestock deaths) consequences of climate variability. Risks to commercial agriculture can be mitigated by response mechanisms like insurance against catastrophes and protection of farmers from bankruptcy. However, Nepalis do not have access to such measures and poor farmers have to absorb climate change impacts, including low productivity and even crop failure, without external support.

iii. However, there is evidence that all is not hopeless. In Bardiya district, the new, three-crop cropping pattern can help insulate farming activities against the harsh climatic conditions by increasing the number and volume of farm produce. Laxmi Tharu and Ramratan Tharu, farmers from Surya Patuwa VDC-6 of Bardiya district, received financial and logistic support from LAPA to construct plastic tunnels. Bardiya DDC distributed tunnels for vegetable farming in eight VDCs where small farmers were very vulnerable. Bardiya DADO provided technical assistance to farmers -- teaching them to construct tunnels, advising them on appropriate crops and the best prices in the

Figure 3-6: Productivity of Paddy, Maize and Wheat (kg/ha) in Bardiya district (Source: Agricultural Census, MoAD, 2014)



market, and how to install a drip irrigation system. Since the crops were protected from extreme heat, cold, rainfall, and wind, farmers could cultivate and sell them throughout the year. This intervention had increased farmers' resilience. Ramratan's income had doubled after he began cultivating crops in a tunnel and he now is a commercial farmer with a higher-than-subsistence level income.

iv. Shanta Rani Chaudhary of Guleria-5, Bardiya, is now an established farmer who is well connected with local markets. She chairs a 15-member women's group supported by the Raising Incomes of Small and Medium Farmers Project (RISMFP), a centrally implemented project under the MoAD. The group has received a plough and a thrasher so that women farmers can run farming activities without support from men. The group has established a repair-and-maintenance fund to which each member contributes Rs. 50 per month. The group also operates a small irrigation system on 4 bigha of land. Because Shanta Rani manages the farm on her own, her husband is now a driver. In fact, their income has increased five-folds over the last three years, and they were also able to purchase farm based equipment.

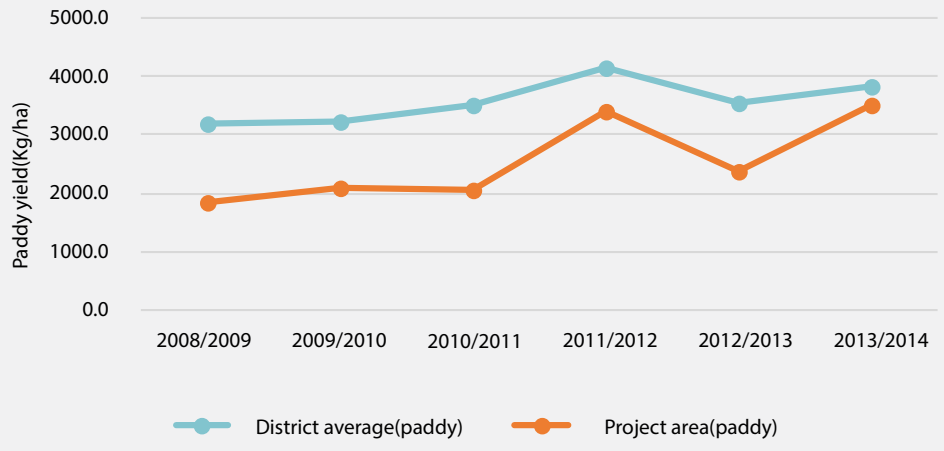
v. Mohan Tharu of Dhodari-8 in Bardiya began to grow vegetables after he received help from the Bardiya DADO to establish a small irrigation project. However, because of his lack of knowledge and government support for modern and high-value cropping, he has continued to grow cabbage, a low-value crop (Figure 3-12). Although the production level was satisfactory, because of low demand he could barely cover the cost of inputs. He is among those who could use support to grow and sell high-value crops.

vi. Farmers in Dhodari VDC of Bardiya face some common problems that they need support to address:

- The lowering of the water level means they need to dig deeper boring wells for sustainable water sources for irrigation
- They need improved seeds suited to germinate and grow in the local climatic conditions, and
- Tunnel farming needs to be scaled up to a com mercial level.

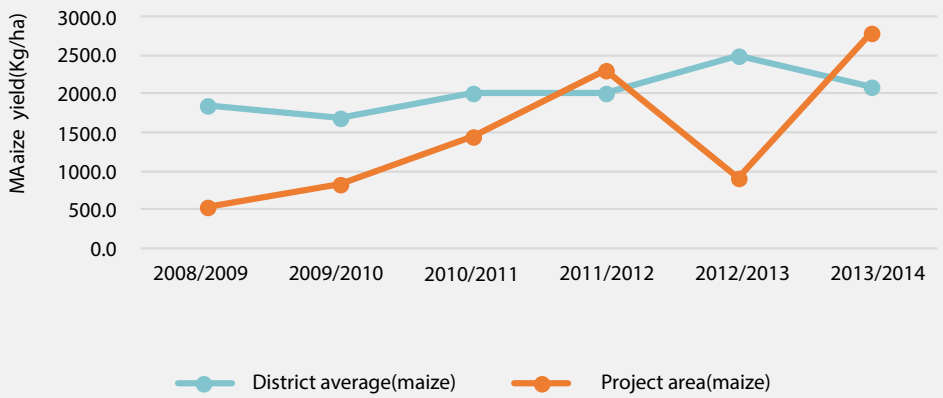
The project areas have benefited from increased access to irrigation facilities.

Figure 3-7: Productivity of Paddy (Kg/ha) of project area compared with Bardiya district



Sources: Agricultural Census, MoAD, 2014 and IWRMP

Figure 3-8: Productivity of maize (Kg/ha) of project area with district average



Sources: Agricultural Census, MoAD, 2014 and IWRMP

DADO Support in Myagdi District

Losses farmers have faced: Not all inputs from the DADO can be successful. For example, the chairperson of Lamagara Entrepreneurship Agriculture Cooperative of Myagdi District said that cauliflower seeds he had received from the DADO in 2011 did not germinate resulting in loss. Similarly, a wheat breed named Gautam had yielded about half of the normal. These and other crop failures indicate that the DADO needs to provide not just good-quality seeds but also ones that are suited to the local conditions. There is a need for location-specific action research and development for introducing climate-friendly agricultural technologies (seeds, machinery, and other inputs).

Inadequate biological records: The DADOs do not have lists of all local varieties, so it was not possible what varieties were vulnerable or had become extinct. There is a need for creating a robust database of local climatic conditions, soil characteristics, and local seed varieties and their key traits.

Time to invest in hardware activities: People are concerned that the government has emphasised only software components such as awareness, which, because it is intangible, and difficult to measure. The DADOs agreed with this criticism, and committed to henceforth focus on substantial support -- one that can direct support to farmers to addressing climate-related challenges.

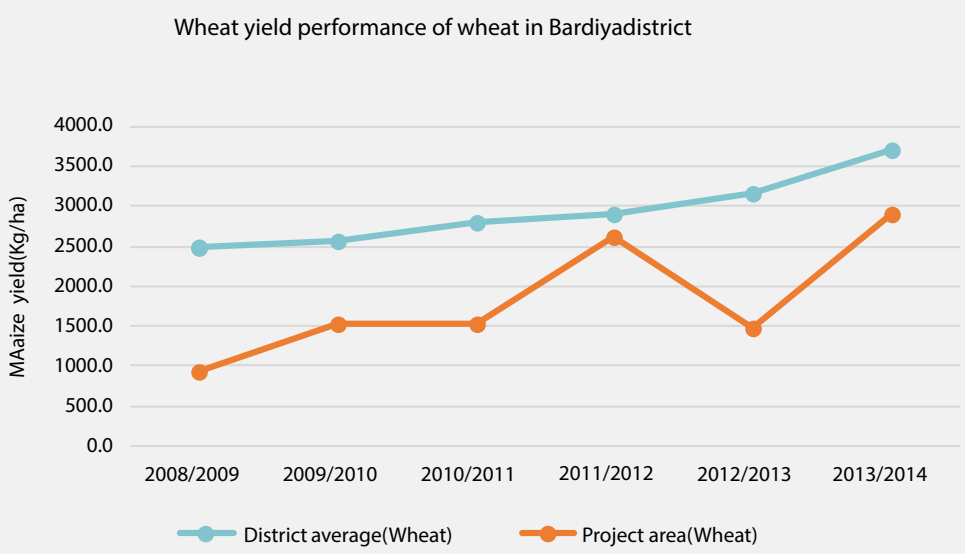
Adaptation to Climate Change Impact in Myagdi

The adverse impacts of climate change affect the vulnerable people first and the hardest because they have lower capacities to cope but other farmers are also affected in one way or the other. Farmers have already implemented several adaptation strategies, some endogenous and some exogenous (Table 3-8).

"In responding to climate change adaptation, we are always aware that the climate continues to change and that we need to transform ourselves using technology well-suited to that change," said a local farmer, who is also chairperson of a cooperative at Singha Tatopani. "Fifteen years ago, the Andheri River used to have enough water for our needs in April/May. Now it does not, and we need to source water from Myagdi Khola," he added.

Until the 1980s, people used to cultivate only maize and paddy. However, due to the combined influences of population growth and shortcomings of conventional agriculture, food insufficiency increasingly became an issue. To boost production and thereby food security, people embraced a wheat intervention

Figure 3-9: Productivity of wheat (Kg/ha) of project compared with district average
(Sources: Agricultural Census, MoAD, 2014 and IWRMP)



programme. In the1990s, a three-crop-per-year cropping pattern was adopted, with maize, paddy and wheat being grown in rotation. Informants said that this strategy was designed both to increase food security and to address climate change. Now DADO is carrying out a pilot research on wheat cultivation.

Crop switching: Farmers used to cultivate Gauri, Gudura, Jethobudho, and other paddy species; they had added other varieties and also cash crops and vegetables, including potatoes. This way they could produce more while also adjusting to the changing rainfall patterns, and the micro-climatic conditions.

Time switching: Farmers had adjusted plantation and harvesting times. The maize crop used to be affected by severe drought conditions in May/June resulting in low production. They had adjusted to this and grew wheat in the spring and maize ripens in July/August when there is more water. By changing timing, farmers were able to have a three-crop cropping cycle.

Alternativefarming: Agricultural entrepreneurship has increased in recent years. The study team had visited a mushroom farm, dairy, vegetable farm, and an orchard. None of the farmers consulted had problems in marketing their produce.

Integrated pest management (IPM): One major objective of IPM is to reduce pesticide use. The DADO had a programme to subsidize the purchase of organic manure to promote IPM.

Livelihood support: Myagdi DADO had provided livelihood support in the form of vegetables and fruit seedlings, including oranges and pears (Table 3-9). However, such initiatives only helped people with land. Generally, the landless and near landless, who comprise upto 25 percent of Nepal's population, have no options but to continue sharecropping. No climate-related agricultural programme in Myagdi was specifically focused on supporting the landless.

Migration: The migration of male youth from Myagdi had resulted in an acute shortage of agricultural labour and the feminisation of agriculture. As a result, gender roles had changed and women were now more engaged in social and economic work in addition to household chores. These activities have had a positive impact on women's empowerment but it has also meant increased workloads. The

In Bardiya district, the new, three-crop cropping pattern can help insulate farming activities against the harsh climatic conditions by increasing the number and volume of farm produce.

Table 3-7: Perceived effects of climate change

Positive effects	Adverse effects
Early ripening of crops and shorter periods of crop rotation	Increase in pest infestation
Shift from growing two crops annually (maize and rice) to three (rice, maize and wheat)	Depletion of water sources
Introduction of new crop to address temperature change	Loss of productivity
	Change in rainfall pattern
	Excessive, deficient and/or unusual rainfall
	Crop failure
	River and flash floods
	Risk of epidemics
	Risk of glacial lake outburst floods
	Landslides
	Hailstorms

The group also operates a small irrigation system on 4 bigha of land.

DADO needs to respond by supporting women with appropriate technology and support for ensuring marketing their produce.

Agricultural insurance: Farmers in the study districts were not fully informed about agricultural insurance and its benefits. The National Climate Change Impact Survey (CBS, 2016) had revealed that only 0.86 percent of farmers had agricultural insurance policies. The DADO needs to work to increase awareness of farmers about insurance.

Institutional mechanisms

Climate expenditure: Myagdi DADO reported that 80-90 percent of spending in the district was capital expenditure. This also indicates that capacity for institutional expenditure was high also because the unspent 10-20 percent was mainly due to delay in the release of the final instalment of budget.

Communication: Horizontal communication among district-level institutions (DADO, DDC, DAO, etc.) was adequate, but deliberate vertical communication with institutions at the national level (MoAD, DoA and DADO) was lacking. In particular, there was a gap in the MoAD's communication of its climate budget with the districts. District–level authorities did not know if any given programme was climate-related or not. In general, DADO officials thought that most agriculture projects were climate-related.

Local level operations: The ASCs are responsible for collecting farmers' expectations and for implementing and monitoring climate-related projects. All agricultural projects are implemented through farmers' groups and the DADO works with these groups at the community level through ASCs (Figure 3-10). The potential individual beneficiaries can also approach the DADOs directly for support and technical advice.

Table 3-10 below shows some central and devolved programmes in Myagdi district and the following conclusions are informed by field consultations with farmers and DADO officials. One benefit of agricultural programmes was that they had helped farmers to organise in cooperatives. Lamagara Commercial Agriculture Cooperative Organisation, for example, had started with just 27 households as members and now has 95. With support from the DADO, it had promoted the production and collection of vegetables. Members earned interest on their deposits and received credit to establish and run agricultural businesses. Some farmers had started agricultural enterprises, including mushroom farming, which had begun changing their lives. For example, Chun Devi Jugjali had received support from DADO for mushroom farming, and she was successfully managing three mushroom tunnels (Figure 3-15). Besides generating income, this initiative had helped in reducing emissions from burning of stalks left after harvesting rice.

Farmers expressed the need for establishing agricultural roads and developing some areas as agricultural corridors. Further, storage facilities also needed to be improved, especially those for vegetables and fruit.

Climate-related programmes, discussed above, have had a positive socioeconomic impact on the lives of ordinary people. While this study was unable to assess the impact at the national and sub-national levels, consultation with farmers in the study districts have suggested that the climate investments had not done enough. For instance, they said that small farmers had not been able to compete with the low prices of large producers. For example, tomato producers were unable to offer their products at the same low prices offered by farmers in the plains. Similarly, in Bardiya district, farmers found it hard to compete with low-priced products from India.

Discussions with Myagdi DADO: Myagdi DADO officials said the effects of climate change had become very visible. In particular, they said that citrus trees could now be grown at higher altitudes compared to the past. The demand for citrus fruits, despite their high prices, was also high. Other crops had also been affected by climate change, so the officials had found themselves making recommendations about adaptable varieties best suited to various altitudes. Although the MoAD has budget provisions for addressing climate change impacts, the Myagdi DADO was unaware of the provisions, either due to their inadequate understanding or due to poor communication from the centre. As such, the Myagdi DADO

Figure 3 10: Construction of tunnel for resilient vegetable farming

was not oriented toward climate change and did not plan activities according to the climate change framework. Even so, a couple of programmes did come under the climate change budget codes. The Organic Manure Promotion Programme was one such programme for which the Myagdi DADO had provided a part of the cost with the rest covered by farmers. However, such partial support also made it difficult for the landless and the ultra-

Table 3-8: Adaptation strategies identified during field consultations

Endogenous strategies		Exogenous strategies	
Practice	**Autonomous**	**In practice**	**Institutional support**
Crop switching	Community knowledge	Wheat farming	DADO
Time switching	Community knowledge	Alternative farming	DADO (prescriptions)
Alternative farming	Community knowledge (experience)	Use of pesticides	Knowledge from market
Use of IPM	DADO, traditional healers, senior citi-zen-farmers	Livelihoods intervention	DADO
Promotion of organic fertiliser	Traditional knowledge, DADO	Migration	Demonstration effect/ globalisation challenge
Conservation of local species	Traditional knowledge, DADO	Agricultural insurance	DADO

poor to participate and derive the benefits. Both DADO officials and the field staff suggested that this gap indicated the inability of existing government programmes to target the deprived and pro-poor communities. In addition, while the programmes were reported to comprise 49-51 percent women, they were not planned with the needs of women in mind. In particular, they had failed to consider the trend of male migration. Agricultural initiatives in Myagdi that received support from the DADO under climate-related programmes are discussed below:

a. Lamagara Commercial Cooperative was established with 26 members, and had 95 shareholders as well as a regular reporting system. Its major work areas included providing fertiliser and marketing products. In the past, before an irrigation intervention was implemented, agriculture was highly sensitive to climate change. Initially, the Myagdi Women's Development Office (WDO) supported irrigation, but that programme turned out to be unsuccessful. Later, the Myagdi DADO revised the irrigation channel design the WDO had proposed and supported its implementation. This system now works satisfactorily and has encouraged cooperative members to adopt commercial vegetable farming on almost 100 ropanis of irrigated land -- twice as much compared to that before the intervention. The improvements in irrigation had encouraged almost one-fourth of cooperative members to practice commercial vegetable farming. The vegetable farmers earn annual incomes of upto Rs. 1.5 million by selling three or four types of vegetables year round. With the extra income, many parents have begun sending children (both sons and daughters) to boarding schools. About 10-12 households also used the income from vegetable farming to purchase land, and savings have also increased slightly, with each household having deposited Rs. 5,000-6,000 in Lamagara Commercial Cooperative. Most members have not, however, taken loans, perhaps because they are risk-averse.

Figure 3-11: Support to women's group

Figure 3-12: Small farmers could not compete in the market with low value crop

b. Only a few large commercial farmers, like Rudra Bahadur Thapa, a recipient of the President's Best Farmer Award, had taken loans to expand their businesses. At the household level, commercial vegetable farming has raised the level of fresh vegetable consumption and thereby enhanced nutritional security. Further, people's access to new technology such as tractors and other equipment had also increased and awareness about health had improved alongside the increasing use of organic manure.

Table 3-9: Livelihood support to address agricultural needs

Livelihood type	Tools
Agricultural tools	Power tillers, pipes, tractors, thrashers
Vegetable cultivation	Seeds, tunnels
Horticulture	Fruit seedlings
Irrigation	Pipes, construction materials
Youth-focused programme	Tailored support according to need

c. Further, with increased membership the cooperative has more actively been seeking participation in programmes, and resources from various government and other development agencies. This also reflects a significant increase in the social and economic integration and empowerment of communities. This organised effort made it possible for them to receive seeds, equipment, training, greenhouse sheds, and a small irrigation system, as well as support under the Prime Minister's Commercial Agriculture Programme.

d. However, although the economic indicators had improved substantially, the social indicators remained largely unchanged, particularly in terms of wage discrimination. Women were paid equally for government work but they received only half (Rs. 450) of the wages men did (Rs. 900) for private agricultural labour. Since most farmers were not organised, they sold their produce independently, and, therefore could not demand fair prices. The president of Lamagara Commercial Cooperative, Kamal Thapa, said that because the farmers were not organised they were not paid the prices they demanded. The ability to demand higher prices was affected by lack of storage facilities. In most cases, it was the Myagdi DADO that had supported the scaling up of production, accomplished through the provision of seeds, equipment, and technical facilities. However, once production increased farmers often experienced volatility in prices due to over supply and lack of government support to stabilise prices (for example, by supporting cold storages).

Figure 3-14: Farmers are now attracted to crop switching

Figure 3-13: Farmers need to find solution to the challenges posed by climate change

Table 3-10: Agriculture programmes in Myagdi District

Central	Devolved
Comprehensive Orchard Improvement Programme	Bali Samrakshan
Prime Minister's Agricultural Modernisation Programme	Horticulture
Crop Development Programme	Agriculture Extension

Figure 3-15: ***Mushroom tunnels***

The Organic Manure Promotion Programme was one such programme for which the Myagdi DADO had provided a part of the cost with the rest covered by farmers.

e. Singha Village Development Committee, Myagdi: Members of cooperative said that they are always ready to cultivate climate-smart crops and adopt climate-smart approaches. One farmer, for example, said he had received Rs. 5,000 for improving his cattle shed and manure pit under the Bhakaro Sudhar (cowshed improvement) programme. This technical and financial support to farmers intended to help them to also use cattle urine as organic fertiliser. However, he added that the money received was only a fraction of the total budget required. The support from the government mainly promoted the production and use of organic manure.

f. One effect of climate change has been longer and more frequent droughts. In addition, the main source of irrigation water, Andheri Khola, has stopped flowing for almost nine months a year. Kedar Poudel, a local farmer had asked the Myagdi DADO for help and obtained support for a pump worth Rs. 25,000 that he used to get water from the Myagdi River. Irrigation had helped the farmer to diversify his sources of income through cereal crops, milk and vegetables. His agricultural activities were integrated. For example, Poudel had used cow dung and urine to fertilise vegetables, thereby saving on input costs. At the same time, the costs of production had increased, as the pump needed fuel and frequent maintenance. The growth in household income had enabled him to invest in the education of his children. Unlike members of the Lamagara Commercial Cooperative, Poudel did not think the lack of markets was an issue. He was involved in two local cooperatives, Subhakamana Multipurpose Cooperative and Dairy Cooperative. The latter collected surplus milk from member households and sold it. Given the intensification of climate change impacts, it appeared that installing irrigation systems was a key adaptation strategy, one that remarkably improved livelihoods and boosted confidence.

g. Subhakamana Multipurpose Cooperative, Myagdi: The Subhakamana Cooperative focused on savings-and-credit activities. It had invested a significant amount of its capital in commercial vegetable farming, poultry and cattle farming and has had deposits of up to Rs. 8 million. Its more than 900 general members live in five erstwhile VDCs. The majority of members were women. Support received by the cooperative from the government included (1) the Prime Minister's Commercialisation Programme, which had given about Rs. 3 million to establish a rental centre for farming equipment; (2) a vegetable production block; (3) storage facilities, including a warehouse; and (4) agricultural equipment. The interventions of this cooperative has had remarkable socioeconomic impacts on the community, particularly in terms of household income,

livelihood options, education, and empowerment of women. Kedar Poudel, chairperson, said the cooperative was not only responsible for bringing about the changes because remittances also had a role and the money had enabled some members to deposit more money that was loaned to farmers for commercial farming.

h. The government had also played an important role by exploring feasibility of local opportunities and promoting them among farmers. The cooperative had helped to increase access to credit. It provided group loans at 10 percent interest and had extended credit of upto Rs. 200,000 to individual farmers, even if they had no collateral. Collateral was also not needed to obtain a loan when a member was sick. Such collateral-free loans are very important for the ultra-poor. That said, whether or not someone without collateral obtained a loan depended on the cooperative's judgment of the trustworthiness of the individual. Such loans are examples that, at least in some areas, the cooperative had interventions that targeted the poor, but it was difficult to ascertain whether or not such loans actually benefited the poor. Poudel, while acknowledging that remittance and governmental support had improved living standards greatly, also pointed out that migration of boys and men had resulted in serious labour shortages in agriculture. Complicating this situation was migration of women receiving remittances to an urban area to be able to send their children to better schools. This had resulted in agricultural land being left barren. Since the rearing of livestock had also declined, the amount of manure available had declined and this negatively impacted land productivity. The Subhakamana Cooperative had tried to discourage internal migration through various interventions but was not successful. Recent declines in remittances have also reduced the cooperative's investment funds. According to Poudel, speculations about a financial crisis have also fuelled increase in withdrawals and this has led to increase in informal money lending.

i. The positive developments in Myagdi include increases in the number of livelihood options, household income, educational opportunities for both boys and girls, and the motivation to save money. Households that sought support from government institutions such as DADO had also increased their levels of mechanisation and cooperatives had also begun promoting mechanisation: many had established centres from where equipment could be rented.

Farmers usually produce seasonal products for sale in local markets and nearby urban areas. In recent years, Myagdi district witnessed an increase in the number of vegetable producers largely due to a rise in local demand and also because farmers have remittance funds for investing in agriculture. Myagdi still purchases a significant amount of fresh vegetables from other districts, particularly Kaski. This has threatened local producers because they cannot compete with the lower prices of imported products.

The agricultural sector faced serious labour shortages: Although the income of rural households had increased substantially due to remittances, migration had created serious social and economic problems. Agriculture faces a serious shortage of workers making it difficult for subsistence farmers to move towards commercialisation. Further, when women who receive remittances migrate to urban areas, the elderly are left alone to farm the lands that they increasingly leave barren, because of shortage of labour needed for cultivation.

Existing support programmes do not address the local context: Because agricultural workers are in short supply, many households farm less land than they used to. However, both DADO

Agriculture faces a serious shortage of workers making it difficult for subsistence farmers to move towards commercialisation.

officials and district-level field staff said that regular and climate-related government programmes largely target farmers with large landholdings and have failed to account for the local problems.

The government had also played an important role by exploring feasibility of local opportunities and promoting them among farmers.

Mechanisation that was introduced was not women-friendly and as a result women farmers had not been able to fully benefit from mechanisation. In fact, without more mechanisation, it will be difficult for agriculture to change from subsistence-level operations to commercial ventures. The DADOs promote mechanisation as one component of commercialisation but have not given enough thought to making the equipment supplied suitable for women.

The productivity of all crops had improved remarkably due to government interventions, thereby providing evidence that the existing projects do have an impact. To increase productivity further, it is necessary for each household in the project areas to secure greater access to irrigation or more land to irrigate. They also needed more inputs, including more access to credit, machinery, and technology; new crop varieties; and improved techniques, approaches, and methods of protecting crops. The fact that productivity had increased suggests that in at least some of these areas, there have been improvements. Average household income generally increases with increased productivity and this leads to investments in education and health, and savings.

Consultations with the DADOs of Bardiya and Myagdi and with agricultural officers revealed that DADOs collect the demands of local groups and forwards them to the district and central levels for implementation. Officials assume that farmers organise and express genuine needs to DADO. This assumption is unrealistic. The ultra-poor are very rarely organised and because they cannot make demands the potential socio-economic impacts of existing government expenditures on the ultra-poor are very limited. The actual impacts are even fewer. In practice, poor households had not been targeted for resource allocation, activities and benefit sharing.

Systematizing Vulnerability Assessments

Local bodies are required to provide financial and technical support for formulating and implementing district disaster management plans (DDMPs) (MoFALD, 2012). The guideline for formulating these plans identifies women, children, senior citizens, Dalits, indigenous nationalities, ethnic groups, Madhesis, Muslims, people from excluded communities, people with disabilities, and single women as vulnerable groups and requires their representation in the process. The guideline also identifies agriculture as one primary area to be included in DDMPs and specifies that disaster risk management (DRM) systems (including climate-related risks) must be incorporated in development policies and programmes through the use of local resources and capacities.

Similarly, district preparedness and response plan (DPRP) includes vulnerability ranking (MoHA, 2011) and specifies that food and agriculture should be one of the clusters considered. The hazard, vulnerability and capacity assessment (HVCA) reports of VDCs, that prioritise hazards and estimate their potential impacts, are available at the district level. The national framework. on LAPA calls for the integration of climate adaptation and resilience in local and national planning for agriculture (GoN, 2011). The main objective of a LAPA is to identify climate vulnerability, adaptation practices, necessary support and ways to efficiently mobilise resources. The LAPA manual (2011) recognised the increasing feminisation of agriculture, and acknowledged that women's knowledge, skills, and solutions to the problem of climate change must be considered.

Figure 3-16: Snapshot of vulnerability rankings of households in LAPAs

Sn.	Household head	Caste	Family number		Vulnerability ranking			
			Women	Male	V4	V3	V2	V1
1	Ram Chettri	O				√		
2	Binod Chaudhari	J						
3	Manoj Chaudhari	J					√	
4	Man Prasad Chaudhari	J				√		
5	Raj Bahadur Dalit	D			√			
6	Kallu Tharu	J				√		

Note- V4: Extremely vulnerable; V3: High vulnerable; V2: Vulnerable; V1: Low vulnerable | J: Janajati; D: Dalit; O: Other caste

Together, these documents provide vulnerability assessment frameworks and assessment tools for the sub-national level. Bardiya DDC had prepared LAPAs for various VDCs. These documents are important sources that could be used to systematise vulnerability assessments in agriculture, but Bardiya DADO does not use them to assess the vulnerability of households, identify climate-related programmes, or for resource allocation. Figure 3-16 shows a snapshot of the vulnerability rankings available. The figure represents vulnerability of households in the Thakurdwara VDC of Bardiya district.

Locally available vulnerability information is scattered and no attempt has been made to integrate it for project identification, planning and implementation. Technicians and officials at the sub-national level (e.g. DADO, ASC, and local bodies) need to be oriented on vulnerability assessment tools and reports, and on the use of such reports for preparing budget proposals. These tools should be used during planning for prioritising climate-related programmes, and to target vulnerable groups. The DADO did not have a data management system and therefore there was no means to track and target poor and vulnerable people for making budget allocations. For instance, the existing system ignores the landless poor, who receive no benefits whatsoever from climate-related programmes, most of which supports only farmers with land. Further, DADO officers were not well informed about climate change and its impact in agriculture and said they need orientation and training on climate-related project identification.

Interventions need to be planned in a manner to ensure that reductions in one area of vulnerability do not result in increases in other areas. Ensuring broad participation by communities in the design of projects can assist in reducing the impacts of negative externalities.

4

Conclusion and Recommendation

Conclusion

Nepal initiated climate change budgeting in FY 2013/14. Though 11 ministries did use climate change budgets in the four years since, the MoF has not released the actual expenditure of climate change budgets, so no gap analysis was possible. Ministry level expenditures are available only for FYs 2014/15 and 2015/16. There is a need for detailed, timely expenditure data by activity and programme for use in analysis and improvements in budget preparation and spending.

Climate change budget allocations have provided more resources to activities classified as relevant and highly relevant. More effort is needed to allocate funds for activities most suitable for insulating poor farmers from the adverse climate change-related effects on farm produce. Further, recurrent expenditure takes up a much larger share of resources compared to capital expenditure in all ministries, especially the MoAD. This needs to be reversed for expanding the productive capacity of agricultural capital and to support modernisation and commercialisation of agriculture. There is also some reason for hope: capital expenditure for relevant activities has increased slightly over the years and this needs to be extended for most relevant activities.

The impacts of existing programmes have been impressive. Climate related projects assessed in this study have substantially enhanced food security and household farm incomes in its target areas. Farming households also have more livelihood options, both on- and off-farm. Farmers have diversified crops and cultivate at least three times a year. Their access to the means of production, such as power tillers; new, zero-tillage technology; new crop varieties, and to markets have all increased significantly. However, simply enhancing the capacity of farmers was not the sole contribution of the project. Besides, other agencies such as the Cereal System Initiative for South Asia (CSISA) had also benefited farmers. The provision of irrigation and machinery means that men can earn income outside the agriculture sector. Enrolment in educational institutions has increased because farming practices are easier and less uncertain than in the past. Despite these positive outcomes, the increase in crop intensity per unit of land has increased the workload of women. The existence of a number of poor households in the programme area revealed that targeting them effectively still needs work. In addition, since there is no data-recording mechanism to track poor households who benefit from the project, the risk of their exclusion is high. Beneficiaries also pointed out that targeting any one community leaves other communities residing nearby vulnerable. No measures were taken or criteria applied to prioritise the vulnerabilities. Projects under the climate change budget code should specifically target the most climate-vulnerable, including women and poor.

The understanding of both national and local level government officials about the gender equality commitments of Nepal and the need to reflect them commitments in programmes was high. Climate change-relevant programmes were also gender-responsive, but both the climate change-responsive and the gender-responsive budget allocations are identified only at the allocation, or national, level. Climate-sensitive planning and programme implementation requires gender responsiveness at the local level that was lacking. Even though there were some positive impacts, such as increase in women's income, the better use of women's time, and

The provision of irrigation and machinery means that men can earn income outside the agriculture sector.

their greater engagement in community organisations. These outcomes were not the result of thoughtful planning, programming and budgeting to reduce gender-specific climate vulnerability but resulted from government's general objective to ensure gender equality and women's empowerment. However, climate investment has not been effective in introducing gender-friendly technologies such as power tillers for reducing the agricultural workload of women. Similarly, all programmes have not been able to fulfil the constitutional obligation of ensuring equal pay for equal work (it was unmet in Myagdi but was met in Bardiya district). This brings us to conclude that some gendered impacts of climate change investment though visible at the local level, have resulted from the national commitment to gender equality rather than the outcome of coherent and robust planning in the agricultural sector. There is a gap in terms of identifying gender-specific need in climate change-related planning and budgeting. Even though public investments have served the interests of women and men in their different gender roles, they have not taken much account of gender-specific needs in the context of climate change.

The improvement in irrigation facilities by the IWRMP in Bardiya district has meant that women must maintain canals, a duty that increases their workload.

There is a major bottleneck for identifying gender- and climate-specific programmes at the local level. At both Bardiya and Myagdi districts there was no gender-specific monitoring and evaluation framework, making it difficult to identify programme-specific gender needs, baselines, targets and outcomes. Gender issues were incorporated only in terms of numbers of trainees, beneficiaries, and participants at events, and what this means is that the government's climate change expenditure has not specifically considered its differential impacts on men and women. Realising the gender equality objective of the government will require more systematic action at all stages of a project, from needs identification to monitoring and evaluation, at all levels. To effectively realise gender equality in climate investment, the government must start with central-level directives and end with clear guidelines for planning and programme formulation. The existing programme formulation guideline does not systematically link to central-level allocations as either gender- or climate change-related programmes.

Field-level information collected by the study team shows that agriculture has been feminised because males have migrated to cities and to other countries for employment. With the men gone, the dual burdens of family and agriculture have fallen upon women. The improvement in irrigation facilities by the IWRMP in Bardiya district has meant that women must maintain canals, a duty that increases their workload. The extension of the cropping season through irrigation in both Bardiya and Myagdi districts has also increased the work burden. Collectively, the visible impacts of climate change, including male out-migration, the operation of irrigation facilities by women, an increase in the length of the cropping season, and cultivation of high-value crops, have increased the workload of women. The increase workload partially offsets the fact women have also become financially empowered because of high yields, and that they have also been able to use their time more effectively.

To ensure that women's issues are adequately heard, women must participate meaningfully in the processes of planning and programme formulation. The field-level study showed that women do not lead or even meaningfully participate in decision-making processes, in both the community level and formal government organisations. Women do not participate in discussions about gender-friendly technologies either at the community level (where demands are created) or at the district level (a primary actor in the supply side). Further, the fact that women-only cooperatives and community farmers' groups have been established is positive, but their capacity to carry out meaningful and productive actions is limited. Women-only cooperatives in Myagdi, for example, needed substantial support from male members of

other cooperatives to conduct any programme. In mixed cooperatives and institutions, women were generally not given leadership roles. There may be a direct link between women's not being decision-makers and the fact that issues relevant to women, like gender-friendly technologies, are not discussed.

The study team's analysis of national-level policies, institutions, and programmes and their implementation status suggests that climate-relevant investments at the ground level do generate benefits for both men and women. However, without a robust data management system, it is impossible to track the differential impacts. The existing system does allow for climate change investments to be tracked for measuring gender equality outcomes.

Given that the impacts of climate change and the response to those impacts are differentiated by gender, interventions to address climate impacts must adopt a gender-differentiated approach for effectiveness. The existing national frameworks are not implemented effectively at the local level, despite the existence of LAPAs, because the activities are not adequately integrated in the local-level planning process.

Both indicators to identify gender-responsiveness of any given programme and legal provisions (the 2005 Local Self-Governance Act) envision women as both decision-makers and beneficiaries. The implementation of climate-relevant programmes at the local level demonstrates that women are seen as important beneficiaries to reach out to, with little or no roles as decision-makers. Thus, the objectives of gender-responsive planning, budgeting, and implementation have been met only partially.

Recommendations

Climate related investment and expenditure.

Climate investments in agriculture-related programmes are identified in the national budget code but district-level stakeholders, particularly the DADOs, were unaware of the provisions of the code and climate-related programmes. The study did not find any significant gap in expenditures made under different headings of climate-related agricultural programmes at the national level. Its field-level assessment of public climate investment in agriculture, however, uncovered a number of discrepancies. These discrepancies could be addressed by implementing the following recommendations:

a. **More programme- and project-level expenditure.** Climate expenditures in agriculture focus on ministerial, departmental, directorate level expenses, and monitoring activities. Programme- and project-level expenditures, in contrast, declined slightly in the last two fiscal years. To remedy this, projects should be selected using cost-benefit analysis designed to promote sustainable agricultural development and livelihood improvements of poor farmers.

b. **Timely budget release.** Budgets need to be released from ministries and distributed to district-level offices in a timely manner as delays result in the freezing of resources due to the procedural requirements of procurement. Budgets allocated to small-scale agricultural activities are modest, so identifying and planning activities at the local level is not a problem.

c. **Tracking system.** All government programmes should have a public expenditure tracking system to improve efficiency of resource flows. District-level public authorities should be provided with the tools of this system to promote a culture of transparency in public financial management. Such a system did not exist at the district level and the DADO was accountable only to the ministry.

d. **Productive expenditure.** Capital expenditure must be better streamlined to promote productive investment as most recurrent expenditure is used for subsidies, and capital

The existing system does allow for climate change investments to be tracked for measuring gender equality outcomes.

The DADO, as technical assistance provider, should play a role in identifying the beneficiaries of LAPA programmes. In the existing system, it is DDC that performs this function.

expenditure on office buildings and equipment. Mechanisation and commercialisation of agriculture can bring sustainable improvement in the livelihoods of poor farmers if there is more investment in productive areas.

e. **Climate change budgets.** Local and district-level authorities should prepare and integrate climate change budgets in their public expenditure systems. They must also specify activities to allow effective evaluation of the effectiveness of every allocation.

f. **Public private partnership (PPP).** PPP can improve the effectiveness of public climate expenditure by developing an agricultural market and bringing producers and the consumers in contact to minimise high profits of intermediaries. Field-level evidence revealed that the prices of farm products that go to producers have hardly increased in the last several years. Innovative investment vehicles require piloting to attract additional capital; PPP approaches can accomplish this and can also help in managing the risk of returns on investment. Financial institutions also need to be developed and strengthened to ensure a strong risk management mechanism that includes establishing rural credit-rating agencies, promotion of guarantees, insurance, value-chain finance, warehouse receipts, climate-smart advisory services, and development of a database. Branchless and mobile banking systems can help to reduce transaction costs.

g. **Technical assistance.** Both lenders and borrowers need technical assistance to commercialise agri-businesses. For lenders, climate financing should play an important role in developing adequate institutional agricultural finance capacity, customising financial products, and improving the capability of agricultural finance staff. For borrowers, climate financing should support on-farm climate-smart practices and technologies, risk management, and ease access to finance. The role of the DADO technical staff should be extended to such assistance.

h. **Integration of climate change budgeting in the revenue system**. Increasing public climate financing in subsistence and commercial agriculture can pave a way for bringing agricultural activities within the tax net and create opportunities for supporting long-term climate change financing in agriculture through the revenue that is generated.

i. **Insurance.** Agricultural insurance should be put into place at three levels: cooperatives should operate as primary insurers, the insurance companies as secondary insurers to top up cooperatives' indemnities, and the central government as guarantor. Under such a three-tier scheme, farmers would receive full compensation for crop or livestock failure. The institution providing agricultural insurance would need proper knowledge and awareness about insurance designs, rating, methods of processing, identification of risks and needs, coverage of risks, modalities and benefit packages, claim handling, and service provision.

j. **Identification of beneficiaries.** The DADO, as technical assistance provider, should play a role in identifying the beneficiaries of LAPA programmes. In the existing system, it is DDC that performs this function. Monitoring would be more efficient with the DADO's involvement in identifying beneficiaries.

Socioeconomic impact. The impact of climate-related investment was visible at the sub-national (project) level. However, it was not clear if climate investment has had a national-level impact, because there were long periods during which there was no data on

climate-related investment. Using a review of available secondary data, however, the study team did correlate climate investment in agriculture and agricultural indicators and has the following recommendations for improving the socioeconomic impact of climate-related investment in agriculture:

a. **Targeting the ultra-poor.** Although the DDC to some extent has pro-poor targeting while distributing its budget, this bias was not found in the existing budgetary resources allocated under various coded climate budgets. The MoAD and DADOs need to review their existing data collection processes and reporting formats, neither of which is sufficient to track the outputs, outcomes, and impacts of government interventions. The format should be revised to include income, vulnerability, land, assets, and access to key facilities. The new format can allow the government to track, monitor, and increase the effectiveness and efficiency of its interventions. The MoAD needs to lead the effort to develop a new format for the purpose.

b. **Addressing changing local context.** Existing programmes do not address the local context. As the social and economic situation is dynamic and continuously changing, the plans and activities of the DADOs should also be periodically reviewed and revised to adjust to the changing context. For example, an agricultural labour crisis was a serious issue in Myagdi, where almost 80 percent households had at least one migrant member, but the DADO programmes did not sufficiently take this into account.

c. **Gender friendly technology.** The government should identify gender-specific needs and gaps, and consider gender-specific needs while making decisions to address the mismatch between demand and supply of gender-friendly technologies needed for addressing the feminisation of agriculture. It should strengthen both demand- and supply-side mechanisms, by empowering women to enable them to make their demands known to concerned agencies and by capacitating the DADOs to identify gender-specific needs with guidance from the national level.

d. **Technical support to gender focal point.** Gender focal points at the national level need sustained technical support to ensure that gender is integrated in climate-relevant planning, programmes, and budgets. These focal points need to be formally linked with the DADOs to make sure gender concerns are integrated at all levels, from policy to beneficiary levels.

The MoAD needs to lead the effort to develop a new format for the purpose.

e. **Understand the climate change-gender link.** Gender focal points and other relevant stakeholders at both the national and district levels need to undergo capacity building for enhancing their understanding of the climate change-gender link for being able to use the Gender Responsive Budget Formulation Guideline in agricultural and other climate change programmes. Such capacity building should be done in coordination with local governments and focal institutions in agriculture.

f. **Mandate to integrate gender in relevant programmes.** District-level gender focal points should have the express mandate to integrate gender in relevant programmes, carry out gender monitoring and evaluation at the beneficiary as well as the local-level planning and programme formulation levels, and provide guidance.

Institutional mechanisms. Efficient institutional mechanisms to facilitate decisions about where resources are allocated can ensure that climate investment has a greater impact. Institutions in the agriculture sector at both the national and sub-national levels facilitate the coordination, collaboration, monitoring

The agriculture sector is a concern at the federal, state and local levels.

and supervision of resource allocations, but inter- and intra-institutional gaps exit. The study team recommends implementing the following mechanisms to address the shortcomings:

a. **Creation and exchange of knowledge among federal-, state-, and local governments.** The 2015 Constitution of Nepal empowers local governments, granting them several powers that they can exercise independently. For instance, local governments are responsible for local environment protection and development. They are also responsible for collecting different local taxes and fees (wealth, house rent, land and building registration, motor vehicle); service charges; fees like tourism fees; advertisement, business, and entertainment taxes; penalties, and land revenue. The agriculture sector is a concern at the federal, state and local levels. It is therefore very important to support and build the capacities of local governments to assess the need for climate investments for effectively allocating resources to build resilient communities. Since the new governance structure assigns joint responsibility for agricultural development, it is necessary to ensure proper creation and exchange of knowledge among federal-, state-, and local governments.

b. **Coded programmes targeting landless poor.** Although central-level government programmes (those long practiced and regular type[8]) are tagged as climate-relevant or highly relevant, when these programmes are implemented in the district and beneficiary levels they function like ordinary programmes. These programmes do not systematically[9] target the most climate-vulnerable people who are landless or nearly landless. Many of landless and ultra-poor have not been included in farmer groups and do not have access to financial services. Boosting the impact of climate investments will require introducing a systematic approach to focus on the poor and climate-vulnerable.

c. **Appropriateness of collection centres.** Marketing and collection centres have been established, but they are not functional. Socioeconomic and marketing studies should be carried out before establishing such centres to ensure feasibility in terms of supply chain and market access.

d. **Communication between farmers and extension workers.** Poor communication between farmers and extension workers means that the genuine needs of the poor, and particularly the climate-vulnerable, are not always collected. To address this weakness, the government needs to review its approach, which collects information on needs based on the demands of the most vocal farmers with little or no communication with vulnerable groups.

e. **Capacity building of the staff.** Few staff -- central-, district-, or local -- have been oriented on climate change. The MoAD needs to carry out special orientation programmes to remedy this gap as such interventions can enhance the implementation capacity of existing staff and contribute towards realising higher socio-economic impacts of climate investment.

f. **Communicating research findings among government agencies.** There is often a lack of coordination among government agencies, particularly between those involved in re-

[8] The authors' impression is that the identification, segregation, and allocation of budget related to climate change are not based upon demands collected at either the district or the field level. In practice, DADOs request the MoAD for activities for regular programmes and the MoAD reviews, prioritises and adjusts those demands according to it budgetary constraints. While formulating regular programmes, the MoAD classifies activities related to climate change in three categories —(1) highly relevant; (2) relevant; and (3) neutral—and assigns them a climate change budget code. It does not carry out vulnerability assessments while formulating activities.

[9] A systematic approach would involve collecting all the district-level information available at different government bodies and using it to optimal effect in programme design. This information would include getting information on climate from DHM district offices, NAPA, and getting information about LAPAs from DDCs.

search, like the Nepal Agricultural Research Council (NARC), and those involved in extension. To increase coordination, regular meetings, discussions, and seminars should be held on various agricultural issues at different levels. Joint field level monitoring by the MoAD and DADO officials could contribute towards better coordination.

g. **Functional interaction.** Functional interactions between national-level institutions, particularly the Gender Equity and Social Inclusion section at the MoAD and its planning, monitoring and evaluation, and climate change divisions for devising gender-responsive climate change-relevant planning, monitoring and evaluation in agriculture is also recommended.

Systematising the vulnerability assessment. Proper vulnerability assessments are not conducted at the local level but need to be as they are dynamic, and must regularly feed into the identification, prioritisation, and formulation of projects, and the allocation of budgets. Systematising such assessments requires the following steps:

a. **Community and household profiles.** Instead of relying only on community demands while formulating activities and distributing resources, the government needs to define the most climate vulnerable areas using a proper database[10] to enable prioritisation and targeting of the most vulnerable communities and households before allocating resources and designing programmes.

b. **Data management system.** Well-structured data management systems are lacking but are needed to increase the effectiveness and efficiency of public expenditure and to enable the government to periodically evaluate its programmes and adjust its decisions accordingly. The ultimate goal of public expenditure is to improve welfare of the public, particularly the poor and vulnerable, by providing them opportunities to increase their incomes. A monitoring and evaluation system[11] is needed to make sure this is being done. Local institutions (DADOs, local governments, etc.) should create a database on the availability of farm inputs (e.g. access to climate-smart seeds), human resources and their capacity (e.g. knowledge, practices, and implementation), household-level information with farm-based characteristics (e.g. access to irrigation facilities, farm size, credit, etc.), and list local crops and their characteristics (e.g. drought-resilient, high-yielding, pest-resistant, etc.). Such a database can support climate related programme identification, and monitoring and evaluation.

c. **Mechanism to track the poor and guide allocations.** At the district level, most programmes are ad hoc and often decided under political influence. There is no proper system for tracking or targeting the poor, and as a result, the poor are often excluded from budget allocations. At the district there is a systemic gap in addressing the needs of the poor and vulnerable. At present climate change-relevant programmes focus only on farmers who have land. To address this all livelihood activities need to target the gaps in knowledge, capacity, and coordination, and the needs of the landless poor.

The DADOs should use available vulnerability assessment reports to assess the vulnerabilities in the agricultural sector for better targeting vulnerable people.

[10] Information on the existing database is scattered across various government bodies and is not documented systematically. As mentioned above, the DDCs have information related to natural resources, profiles of VDCs, and relative vulnerabilities of various entities in the NAPA and LAPAs, but the DADOs do not use this information while formulating programmes related to climate change. It would be very helpful to have this information a systematic database that was updated periodically.

[11] The existing M&E system of the DADO only holds information about programmes, total budgets, and units and targets of activities. It does not include baseline or project end information on poverty and income levels and educational attainment of target groups. Having this information would not only help the DADOs to identify the groups most vulnerable to climate change but also enable target groups to evaluate the effectiveness of the programmes.

d. **Incorporation of learning from vulnerability assessment studies.** Vulnerability assessments should identify not just deficiencies but also potential feedback loops and intervention tools for reducing vulnerability. Such assessments should be used for project identification, planning and implementation. Bardiya has a DPRP, a local disaster risk management plan (LDRMP) and LAPAs. These documents identify vulnerable areas, the root causes of vulnerability, and vulnerable groups, but the DADO there had not used the documents for project identification, planning, or implementation. It would have possibly done that if the climate focal points at the DADO were responsible for documenting the learning from existing assessments and field-based consultations for project identification. The DADOs should use available vulnerability assessment reports to assess the vulnerabilities in the agricultural sector for better targeting vulnerable people.

e. **Capacity building of government staff and communities on climate vulnerability.** The capacity of sub-national level governments and communities should be developed to enable them to address existing vulnerabilities to climatic variability and extremes. They should be able to understand household-level impacts and implement coping mechanisms (transformative qualities of social-ecology) when faced with climate-induced disasters. There is a need to focus on identifying existing adaptation strategies and new ones for benefiting both the larger community and the most vulnerable of groups.

f. **Integration of vulnerability assessment studies in planning and budgeting.** Several climate change programmes and projects are underway in Nepal, including government-run LAPAs and non-government-run projects. For the most part, these consider the poor and gender-specific climate vulnerabilities. By establishing formal linkages between vulnerability assessments and planning and budgeting at the DADOs, these agencies would be better able to integrate poor and gender-specific vulnerabilities and needs into planning and budgeting.

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