



Study and Review of CCA Interventions and Researches in Nepal to Plan Future Investments in Adaptation across the Key Economic Sectors: *Review and synthesis of Nepal's past and current adaptation measures and assess of their effectiveness for planning and advancing the NAP process in Nepal*

(Component 1)

Government of Nepal

Ministry of Forests and Environment

**Building Capacity to Advance National Adaptation Plan Process
in Nepal**

December 2020

Kathmandu, Nepal

Citation: MoFE, 2020. Study and Review of CCA Interventions and Researches in Nepal to Plan Future Investments in Adaptation across the Key Economic Sectors: *Review and synthesis of Nepal's past and current adaptation measures and assess of their effectiveness for planning and advancing the NAP process in Nepal*: Ministry of Forests and Environment (MoFE), Government of Nepal.

"This report is solely based on consultations, compilation, review and analysis of available national and international knowledge products, technical reports, strategies, policies, periodicals and research papers. The report has been benefited from different sources of literatures and ongoing works in subject area. The relevance of this report is limited to the stated purpose of the NAP process in Nepal."



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Acknowledgements

Climate change poses a significant threat to socio-economic prosperity and environmental stability in Nepal. The impacts of climate change differ among different regions, generations, and age classes, income groups, occupations, and gender and affect the most vulnerable population and sectors. The National Adaptation Plan aims to reduce vulnerability from the impacts of climate change by building adaptive capacity and resilience.

The Government of Nepal started the National Adaptation Plan (NAP) formulation process, adhering to the Cancun Adaptation Framework as decided by the 16th Conference of the Parties to the UNFCCC in December 2010. Subsequently, the Government of Nepal formally launched the NAP amidst a program on 18th September 2015, building upon the experiences of the National Adaptation Programme of Action (NAPA). Currently, the United Nations Environment Programme (UNEP) is functioning as the delivery partner of the NAP process through the project, "Building Capacity to Advance National Adaptation Plan Process in Nepal," with financial support from the Green Climate Fund (GCF). This project supports the Ministry of Forests and Environment (MoFE) in the NAP formulation process through a participatory, country-driven, gender-sensitive and multi-sectoral thematic and cross-cutting working group's approach, and emphasizes "leave no one behind" as a guiding principle.

In this context, this document, i.e., **'Study and Review of CCA Interventions and Researches in Nepal to Plan Future Investments in Adaptation Across the Key Economic Sectors: Review and synthesize Nepal's past and current adaptation measures and assess their effectiveness for planning and advancing the NAP process in Nepal,'** has been prepared as a contemporary knowledge product of this project.

I am grateful to Ms. Srijana Shrestha, Under-Secretary (NAP Coordinator); and Mr. Surendra Raj Pant, Asst. Scientific Officer of the Climate Change Management Division (CCMD) at MoFE for coordinating and providing requisite support to finalize the report. In addition, I am thankful to the diligence and consistent assistance of the UNEP Programme Management Unit (PMU) including Mr. Gyanendra Karki, UNEP Nepal's GCF NAP Project Coordinator; Ms. Binaya Parajuli, Gender Affairs and M&E Officer; Mr. Sujan Shrestha, Programme Management Assistant; and Ms. Kabita Mandal, Communication Consultant. I would like to take this opportunity to acknowledge the outstanding efforts of Dr. Ripu M. Kunwar in preparing this report. Finally, I would like to express my sincere gratitude towards all the stakeholders involved during the consultation process for their valuable input to this report.

I believe that the outcome of this report will strengthen knowledge, as well as guide future research and investment requirements that needs to be reflected in Nepal's NAP document.

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Abbreviations and acronyms

ACT	Action on Climate Today	FAR	First Assessment Report, IPCC 1990
ADB	Asian Development Bank	FECOFUN	Federation of Community Forestry Users, Nepal
AF	Adaptation Fund	FRTC	Forest Research and Training Center
AFU	Agriculture and Forestry University	GAP	Good Agriculture Practices
AR4	Fourth Assessment Report (IPCC)	GCF	Green Climate Fund
AR5	Fifth Assessment Report (IPCC)	GEF	Global Environment Facility
ASHA	Adaptation for Smallholders in Hilly Areas Project	GESI	Gender Equality and Social Inclusion
BI	Billion	GHGs	Green House Gases
CAPA	Climate adaptation Plans for Action	GLOF	Glacier Lake Outburst Flood
CARE	Cooperative for Assistance and Relief Everywhere	GoN	Government of Nepal
CARIAA	Collaborative Adaptation Research Initiative in Africa and Asia	HHs	Households
CBA	Community Based Adaptation	HKH	Hindu Kush Himalaya
CBD	Convention on Biological Diversity	ICIMOD	International Center for Integrated Mountain Development
CBOs	Community Based Organizations	IDRC	International Development Research Centre
CCA	Climate Change Adaptation	IFAD	International Fund for Agricultural Development
CCF	Climate Change Fund	IFC	International Finance Corporation
CCMD	Climate Change Management Division	IKI	International Climate Initiative
CDKN	Climate and Development Knowledge Network	INC	Inter-governmental Negotiating Committee
CDM	Clean Development Mechanism	IoST	Institute of Science and Technology
CFUGs	Community Forest User Groups	IPCC	Intergovernmental Panel on Climate Change
CHAL	Chitwan Annapurna Landscape	IT	Information and Technology
CIF	Climate Investment Fund	KP	Kyoto Protocol
COP	Conference of Party	LAPA	Local Adaptation Plans for Action
CSA	Climate Smart Agriculture	LCRD	Low-carbon climate-resilient development
CSOs	Civil Society Organizations	LDC	Least Developed Countries
DFID	Department for International Development	LDCF	Least Developed Countries Fund
DFO	Divisional Forest Office	LEG	Least Developing Country's (LDC) Expert Group
DFRS	Department of Forest Research and Survey	LiBIRD	Local Initiatives for Biodiversity, Research and Development
DHM	Department of Hydrology and Meteorology	M&E	Monitoring and Evaluation
DNPWC	Department of National Parks and Wildlife Conservation	MCA	Multi-Criteria Analysis
DoFSC	Department of Forests and Soil Conservation	MDB	Multilateral Development Banks
DoIT	Department of Information and Technology	MDG	Millennium Development Goals
DRM	Disaster Risk Management	MI	Million
DRR	Disaster Risk Reduction	MOAC	Ministry of Agriculture and Cooperatives
EbA	Ecosystem-based Adaptation	MOALD	Ministry of Agriculture and Livestock Development
EDF	Environmental Defense Fund		
EWS	Early Warning System		

MOE	Ministry of Environment	PA	Paris Agreement
MOF	Ministry of Finance	PIF	Policy and Institutions Facility
MOFAGA	Ministry of Federal Affairs and General Administration	PMU	Project Management Unit
MOFALD	Ministry of Federal Affairs and Local Development	PPCR	Pilot Programme for Climate Resilience
MOFE	Ministry of Forests and Environment	REDD+	Reducing Emissions from Deforestation and Forest Degradation and Sustainable Management of Forest
MOH	Ministry of Health	SBI	Subsidiary Body for Implementation
MOP	Meetings of the Parties	SBSTA	Subsidiary Body for Scientific and Technological Advice
MOPE	Ministry of Population and Environment	SCCF	Special Climate Change Fund
MOUD	Ministry of Urban Development	SDG	Sustainable Development Goals
MOWSS	Ministry of Water Supply and Sewerage	SPCR	Strategic Program for Climate Resilience
NAP	National Adaptation Plan	TAR	Third Assessment report, IPCC 2001
NAPA	National Adaptation Programme of Action	TU	Tribhuvan University
NARC	Nepal Agriculture Research Council	UNCCD	United Nations Conference on Combating Desertification
NAST	Nepal Academy of Science and Technology	UNCHE	United Nations Conference on Human Environment
NBS	Nepal Biodiversity Strategy	UNDP	United Nations Development Programme
NBSAP	Nepal Biodiversity Strategy Action Plan	UNEP	United Nations Environment Programme
NBSIP	Nepal Biodiversity Strategy Implementation Plan	UNESCO	United Nations Educational, Scientific and Cultural Organization
NCCKMC	Nepal Climate Change Knowledge Management Center	UNFCCC	UN Framework Convention on Climate Change
NCCP	National Climate Change Policy, 2019	USAID	United States Agency for International Development
NCVST	Nepal Climate Vulnerability Study Team	VRA	Vulnerability and Risk Assessment
NDA	National Designated Authority	WASH	Water, Sanitation and Hygiene
NDCs	Nationally Determined Contributions	WB	World Bank
NGO	Non-Governmental Organization	WCC	World Climate Conference
NHRC	Nepal Health Research Council	WFP	World Food Programme
NPC	National Planning Commission	WMO	World Meteorological Organization
NTFPs	Non Timber Forest Products	WWF	World Wildlife Fund for Nature Conservation
NTNC	National Trust for Nature Conservation		
ODI	Overseas Development Institute		
OPML	Oxford Policy Management Limited		

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Executive Summary

Owing to the extreme variations in elevation and bio-climate within the short vertical span of the country, Nepal's climate significantly varied, ranging from alpine and nival in the north, to tropical and humid in the south. This varied weather conditions aided the country's climatic variation. The negative consequences of climate change have been witnessed in many sectors, such as forest, biodiversity, agriculture, energy, human health, as well as in the areas of livelihood, while there has been a huge loss of production, people and property due to climate-induced disasters such as flood, landslide, drought and forest fires. Since the ratification of the UN Framework Convention on Climate Change (UNFCCC) in 1992, the government of Nepal paved the way towards adapting and combatting the climate change with the establishment of the Environmental Protection Council in 1992 and the Nepal Environmental Policy and Action Plan in 1993. Along with these protocols, Nepal developed the Environmental Protection Act (1996), Environmental Protection Rules (1997), etc. as precursors of climate change measures. From 2010 onwards, the government of Nepal developed protocols, such as NAPA 2010, REDD Readiness Preparation Proposal 2010, Climate Change Policy 2011, NAP process 2015, etc. as key strategic efforts towards adapting the impacts of climate change and complying the commitment with the UNFCCC.

The National Adaptation Programme of Action (NAPA), the government's first strategic tool to combat climate change, was developed as a requirement under the UNFCCC to access funding for identifying the most urgent and immediate adaptation needs and ascertaining the immediate and urgent needs to offset climate change impacts. Since then, there have been a number of supports from bilateral and multi-lateral agencies to enable the Government of Nepal to work on climate change adaptation through supports on policy formulations, capacity building and awareness raising. The government budget in climate change actions was matched up, and about 6% of the total annual budget of the country was allocated for climate change before 2010, whereas, after the NAPA it has been increased up to about 25% of the total annual budget, resulting in wide range of climate change adaptation interventions. The supports were meant to strengthen community based adaptation practices, scaling up climate smart adaptation to climate resilient development planning, and research and quality data generation. Ecosystem-based adaptation (EbA) was another milestone in addressing climate vulnerability and risks in the country. There are several other interventions, associated with increasing adaptive capacity and resilience, and reducing climate vulnerabilities and risks, run by communities, development partners and government. However, those interventions were scattered, discrete and random.

The UNEP - Green Climate Fund, NAP-Nepal puts a thrust to consolidate the Climate Change Adaptation (CCA) interventions (programmes, projects, practices, research, knowledge and information) in Nepal and their impacts in reducing vulnerability and enhancing ecosystem restoration to guide the future research and investment requirements that needs to be reflected in Nepal's NAP document. Henceforth, the present study was carried out in this regard.

Overall, the interventions were categorized into community-based practices to government-led programmes to donor-managed projects. This report could present a total of 73 project head started from 2005, although the scope of this assignment was to draw knowledge from 2010. In terms of implementation mode, there were five types of projects: community-based practices, climate-smart adaptation, climate-resilient development planning, ecosystem-based adaptation, and research and knowledge management for early warnings and quality data collection. Capacity building and awareness raising were the major thrust of the most of the projects, while the projects addressing the vulnerabilities and risks associated with climate change through research and technology adoption were quite low.

Therefore, the current need of investment on research and quality data generation is quite imperative. There were about 100 national and international development partners working on reducing climatic vulnerabilities and risks and improving adaptive capacities, involving DFID, USAID, UNDP-GEF, ADB, WB and BMUM, Germany as major partners. However, their network and collaboration with the government is weak. As a result, many policies have been poorly executed within this current institutional system. The paradigm shift that is needed is the transition from the current reactive mode of climate change adaptation to a pro-active mode, for instance, instead of focusing on disaster management (post disaster), the focus must me on disaster preparedness (or disaster risk reduction). In order to pursue proactive measures, research and adoption of technology is highly pressing, and the respective investment on those sectors is immediate. NAP process works better on collaboration among institutions for strengthening the current adaptation systems.

1. INTRODUCTION

1.1 Context

The present global concern with climate issues dates from the convergence of scientific, technological, geopolitical and human developments interests in the 1950s (Bolin, 2007; Houghton, 2009). These interests were brought together in the 1961 United Nations General Assembly Resolution, which asked the World Meteorological Organization (WMO) to collaborate in developing opportunities for monitoring weather and climate (Davis, 1990). The formal political discussion of climate change began in June 1973 with the UN Conference on the Human Environment (UNCHE) in Stockholm. The UNCHE identified the need to work cooperatively to solve environmental issues globally (Haibach and Schneider, 2013). In 1974, WMO established an Executive Committee Panel of Experts on Climate Change and reaffirmed greenhouse warming's general scientific expectation. It inspired the early WMO planning for an inter-agency World Climate Programme and triggered the WMO's decision to convene a World Climate Conference (WCC) in 1979.

The WCC-1 (1979), convened by WMO in collaboration with the UNESCO, WHO, FAO, UNEP and others, was the conference of climate and mankind that urged to foresee and prevent potential man-made changes in climate that might be adverse to the well-being of humanity (Zillman, 2009). Likewise, the 10th World Meteorological Congress in 1987 highlighted the global warming as a major threat to the sustainable development and considered that the climate change assessment mechanism should operate under the overall guidance of governments rather than solely through scientists (WCED, 1987; WMO, 1987). The World Conference on the Changing Atmosphere, Toronto, Canada (1988) called upon the governments, the United Nations and its specialized agencies, industry, educational institutions, non-governmental organizations and individuals to take specific actions to reduce the pollution of the atmosphere and support the institutionalization of the Intergovernmental Panel on Climate Change (IPCC) (WMO, 1989).

The IPCC was established by the United Nations Environment Programme (UNEP) and the WMO in 1988 to provide policymakers with regular scientific assessments on the current state of knowledge about the climate change (IPCC, 2007). The WCC-2 took place in 1990 to negotiate the UN Framework Convention on Climate Change (UNFCCC), which undertook an initial international review of the First Assessment Report (1990) of the IPCC (Bolin, 1991). On the basis of the scientific evidence summarized in the FAR (1990) of IPCC, and in line with the guidance from WCC-2, the Intergovernmental Negotiating Committee (INC) for a Framework Convention on Climate Change was established in 1990 to draft the legally binding instrument on climate change.

Accordingly, the UNFCCC was instituted on 9 May 1992. The Intergovernmental Meeting on the World Climate Programme (1993) issued the climate agenda and called for development of an integrated proposal to governments with focus on studies for climate impact assessments and response strategies to reduce vulnerability. Under the influence of the Third Assessment Report (TAR) of the IPCC (2001), Johannesburg World Summit on the Sustainable Development (2002) and the growing realization in UNFCCC and other circles that the global challenge of climate change would have to be addressed through a balance of mitigation and adaptation. To move forward, various international initiatives began to devise strategies for reducing greenhouse gas (GHG) emissions and to adapt to unavoidable climate change (WMO, 2009). COP3 (1997), The Kyoto Protocol obliged developed nations to reduce their emissions to an average of 5.2 per cent less than their 1990 levels in their first commitment, between 2008 and 2012. The second commitment period began on 1 January 2013 and will end in 2020. The Paris Agreement (2015) (Article 4, paragraph 2) asked each Party to prepare, communicate and maintain successive NDCs that it intends to achieve.

1.2 Global milestones of climate change adaptation

The 1992 UNFCCC and the 1997 Kyoto Protocol (KP) did not place enough emphasis on adaptation, as mitigation (reducing emissions) was the main goal. Because of the failure of the world to place adequate regime to limit GHG emissions to a safe level, adaptation to climate change has risen in the UNFCCC negotiations. COP7 (2001) came up with the Marrakesh Accord, which, among others, contained the first substantial package on adaptation. However, the climate change adaptation was at the center of negotiation since 1992, as a way to address the climate change effects. The Accords included the establishment of three funds: (1) a Special Climate Change Fund (SCCF) for adaptation, mitigation, transportation, deforestation etc., (2) a Least Developed Countries Fund (LDCF) for financing the adaptation activities, including the preparation and implementation of the National Adaptation Programs of Action (NAPAs) for the LDCs, and (3) an Adaptation Fund (AF) under the KP.

Decision 5/COP7 from the Marrakesh Accord (2001) on the Implementation of Articles 4.8, and 4.9 of the Convention, also contained decisions on adaptation, including guidance for operationalization of the LDCF, guidelines for preparation of NAPAs and establishing a 12-member LDC Expert Group under the UNFCCC. These two latter sets of actions have important and continuing impacts on how adaptation work and adaptation funding are being thought of and shall be completed over the next decade. The IPCC TAR (2001) concluded with more confidence that climate change could be attributed to human activities. COP8 New Delhi (2002) stated that adaptation to the adverse effects of climate change is of high priority for all countries. Likewise, COP9, decision 10 requested SBSTA to work on the scientific, technical, and socio-economic aspects of vulnerability and adaptation to climate change. On the other hand, the 'Africa COP12' held in Nairobi, Kenya, was regarded as a milestone in the adaptation agenda under the UNFCCC. Since COP12 (2006) (Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change - NWP), adaptation pilots and plans have progressed substantially (Boyd et al., 2009). The COP13, Bali Action Plan (2007) put adaptation as one of four pillars, together with mitigation, technology transfer, and finance. More extensive adaptation was urged to reduce vulnerability to climate change by IPCC (2007).

Over time, the annual Conferences of the Parties (COPs) of the UNFCCC and the Meetings of the Parties (MOPs) have reached an increasing number of substantive decisions on CCA, and their cumulative impact is mounting (Khan and Roberts, 2013). COP16 Cancun, Mexico (2010) adopted the Cancun Adaptation Framework (CAF) as part of the Cancun Agreements and affirmed to enhance adaptation measures with the same priority as mitigation. CAF strengthens action on adaptation through increased financial and technical support, and by strengthening and/or establishing regional centres and networks. The framework also boosts research, assessments and technological cooperation in the field of adaptation, as well as strengthens education and public awareness. The COP16 helped to define the provisions for establishing an Adaptation Framework, set up an Adaptation Committee, and operationalize the Green Climate Fund (GCF) (Harmeling and Ogada, 2011). The GCF was established in 2010 and operationalized in 2011 to support the climate change mitigation and adaptation projects, programmes, policies and other activities in developing country Parties. COP 17 Parties decided to designate the Green Climate Fund (GCF) as an operating entity of the financial mechanism of the Convention. The Kyoto Protocol also recognizes, under its Article 11, the need for the financial mechanism to finance the activities of developing country Parties.

AR5 IPCC (2014) confirmed that each of the last three decades has been successively warmer on the Earth's surface than any preceding decade since 1850. The growing likelihood of a more than 2°C warmer world requires better adaptation policies (Di Gregorio et al., 2017) to mitigate the current and future effects of climate change. Thus, COP21, the Paris Agreement (PA) (2015), aims to strengthen the global response to offset the threat of climate change by keeping global temperature rise well below 2 °C and strengthen the ability of countries to deal with the impacts of climate change through adaptation. In the context, the PA has programmes in place to increase countries' ability to adapt to climate change. Article 7 of the Agreement has provided ample opportunities to further adaptation actions to combat climate change. Studies show that climate change will have impact on the achievements of the SDG (Kaur and Geoghegan, 2013, IDS-PAC-GCAP, 2014).

Moreover, the decision 4/COP23 (2017), held in Bonn, requested the SBSTA and the Subsidiary Body for Implementation (SBI) to jointly address agricultural issues and reduce the vulnerabilities of agriculture to climate change and approaches to addressing food security. From the outset, the COP1 characterized the role of the SBI as developing recommendations to assist the COP in the review and assessment of the implementation of the Convention and in the preparation and implementation of its decisions. COP24, in Katowice, Poland, decided to establish the Local Communities and the Indigenous Peoples Platform (LCIPP) Facilitative Working Group (FWG) to advance its operationalization. Finally, the creation of a 5-year work plan to further integrate gender issues into the UNFCCC was succeeded at COP25 in Madrid, Spain. The COP25 broke the blockade by recognizing the need to support developing countries in coping with the losses and damages caused by the climate crisis.

Table 1. Climate change and adaptation policy/action milestones (Source: www.unfccc.int)

Year	Title	Actions	Supportive actions
1972	UNEP founded	<ul style="list-style-type: none"> For coordinating the UN's environmental activities and assisting developing countries in implementing environmentally sound policies. 	
1973	United Nations Conference on Human and Environment (UNCHE)	<ul style="list-style-type: none"> Solve the environmental issues on global scale. 	
1979	WCC-1 convened by WMO, supported by UNESCO, WHO, FAO and UNEP	<ul style="list-style-type: none"> Foresee and prevent potential human-made changes in climate 	
1988		<ul style="list-style-type: none"> IPCC was established by the UNEP and WMO 	
1990		<ul style="list-style-type: none"> WCC-2 worked for UNFCCC establishment 	<ul style="list-style-type: none"> IPCC First Assessment Report
1992		<ul style="list-style-type: none"> UNFCCC convened 	<ul style="list-style-type: none"> UNCED, Rio de Janeiro
1994	PreCOP	<ul style="list-style-type: none"> UNFCCC comes into force 	
1995	COP1 Berlin, Germany	<ul style="list-style-type: none"> The first Conference of the Parties asks and binds joint measures in international climate action 	
1996	COP2 Geneva Switzerland	<ul style="list-style-type: none"> The UNFCCC Secretariat is set up to support action under the convention 	<ul style="list-style-type: none"> IPCC Second Assessment Report
1997	COP3, Kyoto, Japan 'Kyoto Protocol (KP)'	<ul style="list-style-type: none"> Legally binds developed country parties to emission reduction targets. 	
1998	COP4 Buenos Aires, Argentina	<ul style="list-style-type: none"> Plan of Action for KP. Argentina and Kazakhstan expressed their commitment to take on the greenhouse gas emissions reduction obligation. 	
2001	COP7 Marrakesh, Morocco 'Marrakesh Accord'	<ul style="list-style-type: none"> First operational decision on adaptation (NAPA process). GEF LDC fund in formulation and implementation. LEG created to provide technical support. SCCF and Adaptation Fund 	<ul style="list-style-type: none"> IPCC TAR released.
2002	COP8 New Delhi, India	<ul style="list-style-type: none"> Integrate Climate change and Sustainable Development. Integrate CCA into Development planning. 	<ul style="list-style-type: none"> Convention on Biological Diversity 2002
2003	COP9 Milan, Italy	<ul style="list-style-type: none"> Agreed to use Adaptation Fund in supporting developing countries better adapt to climate change. 	
2004	COP10 Buenos Aires, Argentina	<ul style="list-style-type: none"> Buenos Aires programme of work on adaptation and response measures. 	
2005	COP11 Montreal, Canada	<ul style="list-style-type: none"> The first Meeting of the Parties to the Kyoto Protocol (MOP 1) takes place in Montreal. KP came into force. 	
2006	COP12 Nairobi, Kenya	<ul style="list-style-type: none"> Nairobi Work programme on Impacts, Adaptation and Vulnerability. Capacity building of parties on adaptation. 	
2007	COP13 Bali, Indonesia 'Bali Road Map'	<ul style="list-style-type: none"> Special attention to CCA. Support urgent implementation, NAPA. 	<ul style="list-style-type: none"> IPCC AR4 released.
2008	COP14 Poznan, Poland	<ul style="list-style-type: none"> CLEAR: Carbon Limits + Early Actions = Rewards' (EDF). 	

		<ul style="list-style-type: none"> Rewards for developing countries. 	
2009	COP15 Copenhagen, Denmark	<ul style="list-style-type: none"> Copenhagen accord: Green Climate Fund (GCF) Countries later submitted emissions reductions pledges or mitigation action pledges, all non-binding. 	
2010	Cop16 Cancun, Mexico 'Cancun Adaptation Framework'	<ul style="list-style-type: none"> CAF enhances action on adaptation with the same level of priority as mitigation. Boosts research, assessments and technology cooperation. Formal process of NAP. 	
2011	COP17 Durban, South Africa	<ul style="list-style-type: none"> Durban Adaptation Charter for local government The Durban Platform for Enhanced Action drafted and accepted Initial guidelines for NAP 	
2012	COP18 Doha, Qatar	<ul style="list-style-type: none"> Doha Amendment to KP is adopted by the CMP Doha Climate Gateway Little progress towards funding GCF 	
2013	COP19 Warsaw, Poland	<ul style="list-style-type: none"> GCF, Long-Term Finance, the Warsaw Framework for REDD Plus and the Warsaw International Mechanism for Loss and Damage. 	
2014	COP20 Lima, Peru 'Lima Call for Action'	<ul style="list-style-type: none"> NAP recognized as a resilient delivery Socio-politically and ecologically country driven planning based on scientific/traditional knowledge based 	<ul style="list-style-type: none"> IPCC AR5 released
2015	COP21 Paris, France 'Paris Agreement'	<ul style="list-style-type: none"> Transition towards resilient and low carbon societies Each country to prepare, communicate and maintain successive NDCs that it intends to achieve. Negotiations for Durban Platform for Enhanced Action (ADP). Commit to limit global temperature rise by 2-degree Celsius. 	<ul style="list-style-type: none"> SDG (2015-2030)
2016	COP22 Marrakech, Morocco	<ul style="list-style-type: none"> Dealt mainly with water management and decarbonizing energy supplies 	
2017	COP23 Bonn, Germany	<ul style="list-style-type: none"> Under PA and the 2030 agenda for Sustainable Development, a Local Communities and Indigenous Peoples Platform (LCIPP) was established 	
2018	COP24 Katowice, Poland	<ul style="list-style-type: none"> Decided to establish the LCIPP Facilitative Working Group (FWG) to advance its operationalization Global Climate Action 	
2019	Cop25 Madrid, Spain	<ul style="list-style-type: none"> Support developing countries in dealing with loss and damage caused by the climate crisis. 	

1.3 Climate variability

Nepal exhibits a wide range of climatic conditions due to topographic extremes, ranging from tropical in the south lowland to alpine/arctic in the north. Altitudes ranges from a minimum of 70 metres above sea level (masl) to a maximum of 8,848 masl (DFRS, 2015), combined with diverse terrain and topography creates heterogeneity in the landscape, climate and livelihood portfolios across the country. Along with a diverse terrain, this unique features harbor enriched biodiversity, limited access and constrained livelihood and development. Limited access results in regional disparities in development and discrepancies in income and education between rural and urban area (Sharma et al., 2014; IFAD 2014).

Altitude continues to influence temperature and precipitation patterns. Total annual rainfall increases at altitudes up to approximately 3,000 masl and then diminishes at higher elevations (MoSTE, 2014). Warming seems to be more pronounced in the high-altitude regions (middle mountains and high Himalayas) (WWF, 2005). This indicates that the high-altitude regions of Nepal are more sensitive to and affected by climate change. More than 50 percent of the population live in high-altitude regions (hills and mountains), and this proportion is projected to remain at 47% by 2031, even though the country's landmass in the mountain and hill regions is 77 percent (CBS, 2014).

Table 2. Nepal's climatic zones

Zone	Elevation (m)	Climatic zone	Annual precipitation (mm)	Annual temperature (°C)
Tarai (low-lying plain)	<500	Hot monsoon, tropical	1,100-3,000	20-25
Siwalik hills	500-1,000	Hot monsoon, subtropical	1,100-3,000	20-25
Middle mountains	1,000-3,000	Warm temperate	275-2300	10-20
High mountains	3,000-5,000	Cool alpine	150-200	< 3-10
High Himal	> 5,000	Tundra arctic	150-200	< 3

Source: MoE, 2010a; MoEST, 2014; MoFE, 2018

Mean annual temperatures and precipitations are expected to change in Nepal over the remainder of this century. The most recent analysis of trends from 1971 to 2014 shows that the average annual maximum temperature has been increasing by 0.56°C/10 years (DHM, 2017). The projections indicate that the mean annual temperatures could increase by 1.3–1.8°C by the 2050s, with the highest increase in mountain regions. Along with this, an increase in warm days and nights is predicted (Agrawal et al., 2016).

The Hindu Kush Himalaya Assessment Report revealed that even if global warming is limited to 1.5 °C by 2100, there would be a 1.8 °C rise in temperature in other parts of the world and up to 2.2 °C in the mountains due to elevation dependent warming, a phenomenon where mountains experience rapid changes with rise in temperature (Wester et al., 2018). It is also expected that there will be an increase in inter-annual variability in monsoon rainfall, and an increase in the occurrence of extreme (or heavy) rainfall events (Christensen et al., 2013). According to the Nepal Climate Vulnerability Study Team (NCVST), the precipitation levels could decline by 34% or rise by 22% by the 2030s, decline by 36% or rise by 67% by the 2060s, and decline by 43% or rise by 80% by the 2090s (NCVST, 2009).

1.4 Climate vulnerability

Cities are warming faster than the surrounding outskirts (Baidya et al., 2007). Between 1990 and 2014, approximately 3.4 million Nepalese were affected by floods, droughts, and landslides (MoE, 2010b). It is estimated that more than 1.9 million people are highly vulnerable to climate change, while 10 million are at increasing risk from climate impacts (MoE, 2010a). Moreover, vulnerability to climate change can be exacerbated by other stresses (IPCC, 2007). As suggested by the IPCC (2013), climate-related changes, such as temperature fluctuations, precipitation, and extreme weather events harm the environment and a wide range of sectors, such as water, DRRM, agriculture, industry, local livelihood as well as recreational activities and increase vulnerability. Crops production in Nepal has been significantly affected, and aggravated to the country's food crisis (IRIN, 2008; Wang et al., 2013). Nepal is also one of the 11 countries globally that is most at risk of disaster-induced poverty (Shepherd et al., 2013).

Nepal is considered to be highly vulnerable to climate change, but is also relatively ready to address its impacts, according to the University of Notre Dame Global Adaptation Index (ND-GAIN, 2015). To assess climate vulnerability and to systematically respond to CCA issues by developing appropriate adaptation measures, the GoN prepared NAPA in 2010, which has created and enhanced awareness of climate change adaptation issues at different scales and built long-term capacity through cross-sectorial and multi-stakeholder coordination.

Although Nepal's contribution to global greenhouse gas emissions is only 0.06% (Olivier and Janssens-Maenhout, 2014) but the impact the country is bearing is proportionately high (Eckstein et al., 2019). Nepal has already observed increasing incidences of climate change related impacts over the years (GoN, 2017), which has constrained the overall growth of the economy. Nepal ranks fourth on the Global Climate Risk Index for 2017 with a significant impact on the forest, agriculture and biodiversity, and consequently on local livelihood (MoALD, 2019b). A recent study shows the mid and far western hills and mountains are most vulnerable while the eastern and central Terai are least vulnerable (Mainali and Pricope, 2017). The government prepared the National Adaptation Plan (NAP) process (2015), which aims to reduce the country's vulnerability to climate change and to facilitate the integration of climate change adaptation into policies, programs and activities across multiple sectors and levels (MoPE, 2016b).

1.5 Climate change adaptation (CCA) policy context in Nepal

Nepal, along with over 150 other nations, signed the United Nations Framework Convention on Climate Change (UNFCCC) at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in June 1992. Nepal ratified the Convention on 2nd May 1994, and this convention came into force in Nepal on 31st July 1994. Since 1992, the GoN paved the way towards adapting and combatting the climate change interventions with the establishment of the Environmental Protection Council in 1992, and the Nepal Environmental Policy and Action Plan (1993). Along the way, Nepal developed the Environmental Protection Act (1996) and the Environmental Protection Rules (1997) as precursors of Climate change policies.

Nepal began CCA initiatives in 2001 when the COP7 (Marrakesh Accord) helped establish the Least Developed Countries (LDC) fund, Special Climate Change Fund (SCCF) and Adaptation Fund. The Millennium Development Goals (2001), 10th periodic development plan (2002-2006), Sustainable Development Agenda (2003) and Poverty Reduction Strategy Paper (2003) are the entry-level policy protocols for mainstreaming climate change into development planning in Nepal. Since 2002, the Government of Nepal recognized climate change as an emerging issue when the 10th Plan (2002-2007) acknowledged the influence of weather on overall economic performance (Agrawal et al., 2003). The plan accompanied by the Medium-Term Expenditure Framework (MTEF) paper for the agriculture sector pays the attention to the climate-related risks. Under the MTEF, programs are categorized as P1, P2 and P3, using a set of criteria developed by the NPC. The First National Communication (NATCOM-1) report to the UNFCCC (2004) provided an overview of the national circumstances reflecting Nepal's capacity to respond to the problem, and further describing the causes and consequences with regard to the Vulnerability/Impact and Adaptation issues. Following that, the GoN considered climate change and its impact as a key risk to the country's socio-economy and ecosystems and undertakes a series of climate risk management strategies at the national and local levels (MoSTE, 2014).

In 2002, Nepal started the National Capacity and Self-Assessment (NCSA) Project aimed at developing a national action plan to implement the core-belief of conventions that the nation has participated. Despite the priority, the country has limited resources, technologies and policies for adaptation activities as spelled out in the Nepal NATCOM-1 (2004) (MoPE, 2004). Later, the NCSA resulted in a report and an action plan to jointly implement multilateral environmental agreements (MoEST, 2008). In addition, the GoN prepared the NAPA in September 2010 with documentation of national climate change vulnerability. It was developed with adherence to the decision 29, COP7 (2001) and the guidance of the Least Developed Country's (LDC) Expert Group (LEG). The NAPA was the Nepal government's first strategic document, which was developed, following the requirement of the UNFCCC for the Least Developed Countries (LDCs) in order to secure the LDC fund and to help identify the immediate and urgent adaptation needs and priorities.

Local and applied benefits are reaped off in adaptation; however, the adaptation varies in the types of priorities of programmes and projects they adopt. As the climate change influences the multiple sectors, the climate change adaptation (CCA) has been influenced

by multiple factors, such as policies, institutions and processes. Adaptation to climate change has gained a prominent place next to mitigation on global, national, and local policy agendas (Swart et al., 2014) and the successive adaptation protocols National Adaptation Programme of Action (NAPA), Local Adaptation Plans of Action (LAPA), National Adaptation Process (NAP), etc. are in place as a result. In 2011, Nepal prepared the National Framework on LAPA to implement the adaptation actions at the local level and to ensure integration of climate change adaptation into every level of the national planning process (Regmi and Karki, 2010; Regmi and Bhandari, 2012). Development of the NAPA and REDD Readiness Preparation Proposal in 2010, and Climate Change Policy in 2011 were some of the key strategic efforts of the Nepal's government towards adapting and mitigating the impacts of climate change, complying the commitment to the UNFCCC. WWF Nepal provided the financial and technical support to the Ministry of Environment in Nepal to formulate the Climate Change Policy in 2011.

Alongside the Climate Change Policy, the National Planning Commission (NPC) developed its framework for climate-resilient planning. It includes a useful format for screening plans, looking at core, support, and institutional systems (NPC, 2011). National Framework on Local Adaptation Plans for Action (LAPAs), developed in 2011, presents an approach for “delivery of adaptation services to the most climate-vulnerable areas and people”. Similarly, the CCA and Disaster Risk Management in the Agriculture: Priority Framework for Action 2011–2020 provides a roadmap to shift its approach from reactive emergency response to proactive climate adaptation and climate risk management in the agriculture sector (MoAC, 2011). In order to work on disaster risk management, the Local Disaster Risk Management Planning Guidelines (LDRMP), 2012 was designed (MoFALD, 2012). The Agriculture Development Strategy (2015-2035) focuses on improved preparedness and response to emergencies, and climate smart agricultural practices (ADB, 2013). Likewise, the National Adaptation Plans (NAP) 2015 aims to reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience; and integration of CCA into existing policies/plans and programmes within all relevant sectors and at different levels (MoPE, 2017). In the same way, the Forestry Sector Strategy, 2016-2025 identifies climate change mitigation and resilience as one of the eight strategic pillars.

Besides, the REDD concept has been introduced in Nepal since 2008 (MoFSC, 2010). REDD Cell established in 2009 invigorated as REDD⁺ Implementation Centre in 2014. Nepal REDD+ Strategy 2018, Forest Reference Emission Level/ Forest Reference Level (FREL/FRL) 2017, DRR Management Act 2017, Nationally Determined Contributions (NDCs) 2016, NATCOM-2 (2014), etc. were other milestones achieved while advancing the National Adaptation Plan Process. NATCOM-1 emphasizes studies and assessments of measures on adequate adaptation to climate change. In particular, the NATCOM-2 (2014) emphasizes sector specific adaptation measures, such as agriculture and food security including development of drought resistant varieties; development and extension of agronomic practices; extension of soil and water conservation technologies; improvement in rangeland management and fodder production; reducing heat stresses in livestock; and disaster risk reduction; forest and biodiversity includes awareness raising, conservation and protection of endangered and protected wildlife, community level adaptation plans, monitoring of forest health through management of landscape level conservation, habitat connectivity, invasive species control, ex-situ conservation, afforestation, etc.; water and

energy include GLOF monitoring, DRR, integrated water resource management, improve ground water recharge, hydrological networks, etc.; WASH includes occupational safety, working environment standard, water quality, etc. On the other hand, a report for NATCOM-3 (2017) updates the greenhouse gas emission (0.06%) from Nepal and projects that the GHG emission can be expected to be increased in the coming days (GoN, 2017).

REDD+ Strategy 2018 aims to enhance ecosystem resilience through mitigation and adaptation approaches by minimizing the causes and effects of the drivers of deforestation. The Paris Agreement (2015) (Article 4) asked each Party to prepare, communicate and maintain successive NDCs that it intends to achieve. Article 7 acknowledges that adaptation should follow a gender-responsive, participatory and transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems, with a view to integrate adaptation into socioeconomic and environmental policies. DRR Management Act 2017 designates climate change related disaster as natural disaster. The Local Government Operation Act (LGOA) 2017 recognizes that local people and local bodies are the most appropriate points of entry to meet the climate change adaptation needs at the local level (MoLJA, 2017).

Now, CCA has been considered as a fundamental to safeguarding vulnerable communities, ecosystems, and relevant climate-sensitive sectors from the impacts of climate change (MoFE, 2019). The Government of Nepal has also endorsed the National Climate Change Policy (NCCP) 2019. The recent Environment Protection Act (2019) is correspondingly helpful to accelerate the CCA in Nepal. Furthermore, the NCCP (2019) aims to contribute to the nation's socio-economic prosperity by building a climate resilient society.

It has outlined policy, strategy and working strategies for 12 sectoral and inter-sectoral themes: 1) Agriculture and Food security; 2) Forest Biodiversity and Watershed Conservation; 3) Water Resource and Energy; 4) Rural and Urban Settlements; 5) Industry Transport and Physical Infrastructure; 6) Tourism, Natural and Cultural Heritage; 7) Health, Drinking Water and Sanitation; 8) Disaster Risk Reduction and Management; 9) Gender and Social Inclusion, Livelihoods and Governance; 10) Awareness Raising and Capacity Building; 11) Research, Technology Development and Expansion and 12) Climate Finance Management. This study gives a snapshot review of Nepal's CCA projects and programmes being implemented between 2010 and 2019 and outlines their cover and impacts.

1.6 GCF-NAP Nepal

The Green Climate Fund (GCF) was created to support the efforts of developing countries in responding to the challenge of climate change. Currently there are unprecedented levels of adaptation finance from the GCF and by multi/bi-lateral donors, and national governments for climate change adaptation (Preston et al., 2011; Termeer et al., 2012). There are three projects in Nepal funded by the GCF, and all of these projects are subjected to enabling the policy environment and development planning at the central government. The first one, the GCF Readiness programme (07.2016-04.2018) worth 1.5 million helped the GoN access and absorb alternative sources of climate finance, and take forward priorities for climate-resilient development, integrating national plans and policies such as the National Adaptation

Programme of Action (NAPA), national climate change policies, National Adaptation Plans (NAPs), National Determined Contributions (NDC) and sectoral plans. Under the GCF's Readiness Programme, Nepal received a grant of US \$ 3 million via the UNEP for preparing country's National Adaptation Plans (NAPs).

On 23 September 2018, the Government of Nepal and the UN Environment Programme launched the National Adaptation Plan (NAP) project – **“Building Capacity to Advance the National Adaptation Plan (NAP) Process in Nepal,”** to build institutional capacity to deal with adverse impacts of climate change. This is the Asia's first Green Climate Fund (GCF)-financed NAP project to support multi-sectoral, medium to long-term adaptation planning and budgeting, including in agriculture, food security and infrastructure resilience in order to advance the country's adaptation planning process. This project supports the Climate Change Management Division (CCMD) of MoFE, Nepal in reducing the vulnerability to climate change, and increasing resilience by integrating climate change adaptation into development planning processes. In particular, it facilitates the development and enhancement of ‘country capacity’ to promote CCA through policy, institutional, community and individual approaches. Establishing and strengthening the system for sharing knowledge and development of strategies to implement CCA benefits at different levels complements in vulnerability reduction and resilience building against the climate change is imperative.

1.7 Significance

So far, the country has formulated over a dozens of climate change protocols, but, their implementation is insufficient unless they are effectively materialized and backed up by the findings of researches and projects. The research on CCA was almost negligible in Nepal and even in the Himalayan countries, leading to a daunting respond to climate change. IPCC (2007) AR4 Report designated the Himalayas, including Nepal as a “white spot” because of the limited number of scientific studies conducted. A review of adaptation research (ISET Nepal, 2008) identified that Nepal is particularly likely to experience extreme climate fluctuations.

CCA is a response to the impacts of global warming and climate change (Grunies et al., 2016). The IPCC AR5 (2014) defines adaptation as the process of adjustment to actual or expected climate and its effects. The adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. Adaptation needs vary from place to place, depending on the sensitivity and vulnerability to environmental impacts (Sarkodie and Strezov, 2019). Adaptation is particularly important in developing countries where the resources are limited and the effects of climate change are compounded (UNFCCC, 2011). Thus, the adaptation challenge grows with the magnitude and speed of climate change and confines in the areas where the management strategies are disintegrated. The CAF (2010) also boosts research, assessments and technology cooperation on adaptation, as well as strengthen education and public awareness.

1.8 Rationale

The Government of Nepal has developed a number of climate change policies, plans and strategies, but their implementation has not progressed as anticipated because of its

limited integration into development plans, programmes and policies. Translating policy instruments into action requires enhancing the knowledge, understanding the task, implementing the efficient and acceptable measures, fair sharing of benefits and ownership through regular development programmes. Likewise, an effective adaptation planning requires reliable and high quality data. In the context, availability of climate change data and other data on the environment is vital in assessing potential climate change impacts and planning adaptation activities.

Socio-economic data are also important since they provide information about the vulnerability and adaptive capacity of a certain region or country. Information about relevant policies, plans and strategies at various levels is also essential to make sure adaptation activities are aligned with other planning processes. Low adaptive capacity is associated with limited information, poor access to service and inequitable access to assets (Gentle and Maraseni, 2012). The studies on CCA in Nepal are handful, and are discrete, scattered, scanty and inefficient to help integrate adaptation into development planning.

In this connection, UNEP GCF NAP Nepal project puts a thrust to consolidate the CCA research, knowledge and information in Nepal and its impacts in reducing vulnerability and enhancing ecosystem restoration. It is estimated that the outcome of this activity will strengthen the knowledge, as well as guide the future research and investment requirements that needs to be reflected in Nepal's NAP document. It is therefore, a timely endeavor and highly pressing pursuit to consolidate the knowledge to pave the way forward to integrate CCA in development planning.

1.9 Objectives of the study

The following objectives were intended to achieve while carrying out this assignment:

1. Review and synthesize Nepal's past and current adaptation measures across 12 sectors contained in Nepal's National Climate Change Policy (2019), and catalogue the factsheets on each category/type of adaptation measures implemented by different agencies/projects.
2. Assess the adaptation effectiveness of Nepal's past and current adaptation measures, in particular, ecosystem-based adaptation approaches, with a view to recommend medium and long-term adaptation measures to be included in Nepal's NAP priority programmes.
3. Review and assess Nepal's past and present climate change adaptation researches for adaptation planning.
4. Develop a rationale for a coherent and coordinated climate change adaptation research programme and a roadmap for its development. Set up a framework on 'how and where to generate adaptation services and what could be the best vehicle to transport those adaptation services to the most vulnerable systems and households'. Focus is to be given to the ecosystem-based adaptation and ecosystems restorations.

1.10 Organization of the report

Chapter One presents an introduction, along with global and Nepal climate change adaptation milestones and policy contexts. Climatic and physiographic heterogeneity of the country props up the severe vulnerability and susceptibility to the climate change, as outlined in the chapter. The chapter also explains the GCF-NAP Nepal project and its objectives. The objectives of this assignment and rationale were also described in this chapter.

Chapter Two describes the methodology adopted in this assignment. It provides the approaches and methods of the present study and illustrates them in a conceptual framework. Detailed description of the project outputs along with CCA researches, their features, collaboration, geographical cover, span and success was described in the Chapter Three.

Chapter Three synthesizes the findings of this study and communicates them as two separate output: Output 1 and Output 2. The first elaborates the review of Nepal's past and current adaptation measures with the factsheets of selected CCA measures/projects. This finding particularly adheres to the objective one. It provides an overview of completed and on-going CCA projects and their resources, achievements, outputs and recommendations. Adaptation effectiveness of each project/measures was analysed with a view to recommend medium and long-term adaptation to be included in Nepal's NAP programmes and was presented in the second Output.

Chapter Four concludes both the output sections and recommends the way forwards. The overall analyses lay foundation for future investments in CCA across the key sectors outlined by NCCP 2019. **The good lessons demonstrated in the project assessment include a fundamental shift in** approach from reactive emergency response to proactive climate risk management in the short to medium term, and to adaptation development planning in the medium to long term.

2. METHODOLOGY

2.1 Approaches

Both review and consultative approaches were considered while carrying out the assignment and developing the report. However, the review and organizational consultations and expert interview were major methods in compiling, collating and making concise compendium of projects, programmes and research papers pertaining to CCA in Nepal. The former was a major and frequently adopted, complemented by interviews with experts and project coordinator. We carried out both extensive and intensive review of literature in order to get the complete, reliable and quality data and information.

2.2 Methods

2.2.1 Scope finalization

As we were assigned to review the Nepal's CCA projects, programmes and published papers/researches, while focusing on the 12 sectoral and inter-sectoral themes defined in the National Climate Change Policy 2019, and adhering with the NAPA generated programmes and measures, only those attributes following the themes of NAPA 2010 and NCCP 2019 and implemented between 2010 and 2019 were reviewed. Other additional scopes were sorted out, while consulting the project coordinator.

2.2.2 Consultation/Interview

Consultation/Interviews with adaptation proponents, project coordinator, and CCA experts were useful in identifying Nepal's CCA measures, qualifying the criteria for assessing past and current CCA programmes and measures, in particular on EbA approaches for medium and long-term planning. This has also helped to sort out the major research organizations engaged in CCA research in Nepal, focusing on the 12 sectoral themes as outlined in the NCCP 2019.

2.2.3 Review

Effective adaptation planning requires reliable and high-quality data, nonetheless, such data and information are often difficult to access, especially in developing countries like Nepal. We tried our best and conducted the review systematically and categorically collated the data and information in order to communicate the presentation chronologically, coherently, consistently and concisely. Review methodology was followed systematically with adherence to the ToR and its outputs. This systematic review follows the review methodology developed by the International Institute of Sustainable Development (IISD, 2014) and Patra and Terton (2017) with modest updates. Overall, CCA interventions were reviewed under the following five categories:

- 1) Review of government policies, plans and programmes
- 2) Review of projects of organizations
- 3) Review of community based practices
- 4) Review and open web search of published papers
- 5) Review of other pertinent papers

The review of CCA projects and programmes measured so far based on the review of documentation (NAPA generated programmes and measures) was meant to synthesize the information, document the knowledge and highlight the gaps.

Along with that, the open web search research review was carried out to identify the major research organizations and their studies involving the CCA research in Nepal in relation to 12 themes contained in the NCCP 2019 in order to advance the systematic adaptation research and planning in Nepal. The text-mining method was used for the information retrieval and knowledge mining. The method analyses the text according to text characters or sentence structure (Scherf et al., 2005; Regmi and Shrestha, 2018) in order to reduce the time taken to identify, categorize, and summarize the relevant literature (Thomas and Ananiadou, 2011). As the COVID crisis limited the visits to institutions and libraries, the systemic web search was intensively adopted following Vij et al., (2018).

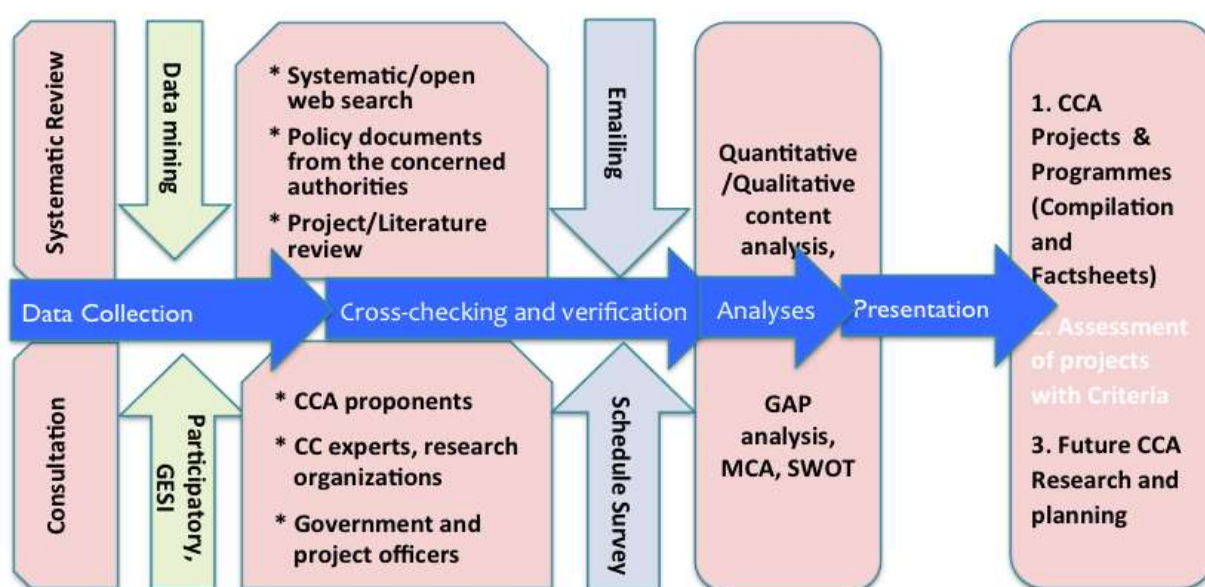


Figure 1. Conceptual framework of this study

Finally, the review synthesis was organized, following the categories adopted in the data collection procedure. Within each category, the review documentation was followed in line with 12 themes of the NCCP (2019).

2.2.3.1 Review of CCA projects, programmes and other interventions

The review was pursued in a coordinated and chronological way, thus, the CCA pattern overtime is effectively manifested. Why Project/Programme review: We have presumed that the new issues have arisen since the climate change has impacted to everyone and everything and the resultant was curtailed by the dynamics (population growth, changing temperature and rainfall pattern, land use change, development and climate change actions, etc.). Steps followed for review were as follows:

1. Need identified: Focus (CCA) and theme identified
2. Relevancy: Since 2010 (As the Government of Nepal developed NAPA)
3. Analysis: Cover, strength, weakness, effectiveness

Adaptation programs and projects in Nepal were identified through a review of the websites of the UN agencies, multilateral development banks, bilateral development agencies, and international NGOs. The review covered the projects and programs that aim to support climate change adaptation, as reflected in their title, goals statement, and/or objectives statement (Patra and Terton, 2017). All relevant projects and programs were tabled in a database and classified/assessed in accordance with the categories as follows:

1. Project Period: Project start and end
2. Project Status: Completed, Running
3. Collaborators: Funding and implementing
4. Geographic cover: National, Provincial, District, Municipality (Village)
5. Project activities: i) incentives, ii) awareness raising and capacity building, iii) policy and plans, iv) agriculture and livestock, v) protection, restoration and management (Donatti et al., 2020).
6. Focus sector: 12 sectors based on NCCP 2019.
7. CCA type: i) CbA, ii) EbA, iii) CSA, iv) Climate Resilient Dev. Planning, v) Research and Knowledge Management
8. Implementation arrangements: i) donor-government as major stake, ii) government as a partner, iii) donor-NGO-CBO.

2.3.3.2 Published Papers/Researches

There are a number of studies, project reports and programmes concerning the CCA produced by the organizations. This study reviewed the studies, reports, projects and programmes pertaining to the CCA and consolidated the acquired data, information and knowledge into a database to help integrate the successes and lessons in development planning. Projects, programmes pertaining to CCA and the published papers were reviewed concisely, chronologically, coherently, and consistently. Besides, climate change related programmes, technical reports and other published documents were also reviewed. Instruments/methods to be used and followed in the entire assignment from cataloguing the information to consultation to write-ups were developed based on the assignment and ToR of the project. This review was complemented by consultative process where the national, provincial, community and local stakeholders were interviewed as guided by CCMD, GCF-UNEP, and NAP PMU (Annex 1). The interview schedule was prepared as a part of the inception phase (Annex 2,3).

2.2.4 Analyses

After making extensive (project and researches carried out in Nepal, in particular, between 2010 and 2019) and intensive reviews (themes, actions, areas, inputs, beneficiaries, strength, lessons, etc.), the proper documentation and assessment of the effectiveness of each project was carried out in order to shed light upon the ways forward based on the lessons learned and best practices. Based on the project/programme review, the concise information of project context, collaborators, inputs, beneficiaries, outputs, strength, challenges and way forward were abstracted in factsheet, following the guide. (Annex 2).

Whereas, the overall project effectiveness was evaluated through criteria and utilized for Component 2. To ease assessment, criteria were developed following national and

international standards. A Multi-Criteria Analysis (MCA) was used to identify context-specific criteria for looking at the effectiveness of adaptation interventions. The criteria were discussed with the CCA proponents, experts, project personnel and communities. Based on these mutually agreed criteria, a general effectiveness analysis was done. The analysis also followed a qualitative method with quantitative steps since the qualitative information were quantified and measured for the Qualitative Content Analysis (QCA) (Mayring, 2014).

2.2.5 Priority framework

With due focus on mid and long-term planning, EbA, ecosystem restoration and in adherence with the 12 themes identified by the NCCP 2019, a framework on sustainable generation and delivery of adaptation services to the most vulnerable systems and households was developed. Focus was given to maintaining and building resilience, reducing vulnerability, capacitating institutions, and integrating CCA in development planning for strengthening adaptive capacity.

3. FINDINGS

3.1 Context

Owing to the extreme variations in elevation and bio-climate within the short vertical span of the country, Nepal's climate varies significantly (Dixit, 2020), ranging from alpine in the north to tropical and humid in the south (NBSAP, 2014). The climate is predominantly influenced by four major factors, namely altitudinal variations, monsoon, westerly disturbances and steep terrain. These diverse avenues make climate and its associated management regimes complex in Nepal. The country has relatively limited meteorological records, constraining the explicit analyses of climate trends, including the pattern of temperatures and precipitation (Patra and Terton, 2017).

The recent analysis of trends from 1971 to 2014 shows that the average annual maximum temperature has been increasing by 0.56°C/10 years (DHM, 2017). The projections indicate that the mean annual temperatures could increase by 1.3–1.8°C by the 2050s, with the highest increase in mountain regions. Along with this, an increase in warm days and nights is predicted (Agrawal et al., 2016). The Hindu Kush Himalaya Assessment Report revealed that even if global warming is limited to 1.5 °C by 2100, there would be a rise of 1.8 °C in temperature in other parts of the world, and up to 2.2 °C in the mountains due to elevation dependent warming – a phenomenon where mountains experience rapid changes with rise in temperature (Wester et al., 2018). Moreover, vulnerability to climate change can be exacerbated by other stresses (IPCC, 2007).

Box 1. Projected Weather and Climate Changes in Nepal

Nepal currently experiences a warm spring between March and May, monsoons that last from June to September, and largely dry winters. Average annual temperature is about 27 °C, varying by region and altitude. Rainfall is driven by monsoons, which brings about 250-450 mm of rainfall each month.

Temperature: Projections suggest increases of 1.3-3.8 °C by 2060 and 1.8-5.8 °C by 2090 from the 1980-1999 base-period. Warming is expected to occur more rapidly during the winter months and in mountains.

Precipitation: Average annual rainfall has decreased since 1960, by an average of 3.7 mm per month per decade. This decrease particularly influences the monsoon period (June-September). Climate models suggest that southern Nepal will experience increases in rainfall.

Extreme events: Floods and landslides are common occurrences. These events are triggered by heavy rainfalls, while rapid snow and ice melt in the mountains complicated much. Glacial melt resulting from increased temperature can increase risk of Glacial Lake Outburst Floods (GLOFs). Droughts are also becoming more frequent, particularly during the winter months and in historically dry areas.

Source: https://www.climatelinks.org/sites/default/files/asset/document/nepal_climate_vulnerability_profile_jan2013.pdf

The negative effects of climate change have been experienced in many sectors, such as agriculture and food security, forests and biodiversity, energy, health, tourism, habitation, infrastructure development as well as in the areas of livelihood, governance and gender. There has been a huge loss of production, people and property due to climate-induced disasters, such as flood, landslide and forest fire every year. In Nepal, between 2000- 2010, climate-induced disasters killed more than 4,000 people and caused economic losses of US\$ 5.34 billion (GoN, 2010). Due to climate variability and extreme weather events, it is estimated that Nepal losses ca. NRs 60 Bl/ yr in 2017 prices (NPC, 2017), which is about 2% of GDP per year. By 2050, the cost is estimated to increase by 2-3 %. Climate change brings greater water stress and scarcity and poses a real threat to food security in many countries (IIED, 2015). The aftermath of these climate change impacts curtailed the health, hygiene, habitat and the hospitality of environment and livelihood.

Poor understanding of impacts of climate change on species and ecosystems, weak assessment and learning loop, and inadequate capacity are some of the major gaps and issues in effective implementation of climate change adaptation and mitigation programmes. Understanding the interactions among the forest, agriculture, water management, disaster risk reduction and other livelihood systems, on the one hand, and climate scenarios, on the other, has implications on the development of effective strategies for adapting to both short and long-term impacts of climate change. There is considerable policy interest in understanding how human populations will respond through mitigation and adaptation to these constraints (Warner et al., 2009). Building a climate-resilient society through climate change adaptation is quite challenging in Nepal.

3.2 Mainstreaming climate change

Mainstreaming climate change adaptation is the iterative process of integrating considerations of climate change adaptation into policy-making, budgeting, implementation and monitoring processes at national, sector and subnational levels (UNDP-UNEP, 2011). It focuses on integrating climate change adaptation options into government policies and programmes, such as national development plans or sectoral initiatives based on country-specific evidence (OECD, 2009).

3.2.1 Climate change in policy and plans

All ecological, social, economic and human systems need to adjust to the changing climate and the expected effects or impacts in order to minimize the potential negative feedback. This “adjustment” by both natural and human systems is commonly referred to as “adaptation” (IPCC, 2001). The IPCC AR5 (2014) defines adaptation as the process of adjustment to actual or expected climate and its effects. The adaptation seeks to moderate or avoid harm, or exploit beneficial opportunities. Thus, adaptation is any action taken to reduce the impact or harness the benefit from the effects of climate change. Adaptation requires planning for change so that a suite for the future based on existing knowledge is achieved (Karki et al., 2017).

The adaptation approaches range from altering the threats to avoiding the impacts to acceptance/minimization of loss to assimilating the actions in planning. The urgency associated with adaptation is how it can be facilitated, supported, planned and sustained (Nkiaka and Lovett, 2018). While adapting, the vulnerability of a system to climate change differs substantially and compounds with human and geophysical systems (UNFCCC 2006). Thus, the adaptation interventions could be a wide range of practice of addressing the vulnerability (poverty reduction, food production, safe drinking water, etc.) to building capacities (governance, awareness raising), non-climatic measures to managing risks (integrate climate information in development planning) and confronting climate change (transform the system), climatic measures (McGray et al., 2007).

In the light of variety of options of CCA in reducing the climate vulnerability and risk, the plethora of measures, ranging from the early initiatives of setting up priorities to instrumenting protocols, assessing risks and vulnerabilities, as well as integrating CCA in development planning are in place. It is widely accepted that policies provide a supportive environment in planning and executing adaptation interventions to climate change (Berman et al., 2015; Zougmore et al., 2016) because adaptation embraces incorporating

future climate risk into policymaking and practices (MoEST, 2012). Moreover, adaptation benefits are rather perceived at a lower level, which is regional or local, and therefore, measures are mostly implemented by local actors. The benefits of adaptation actions primarily accrue to those who undertake the measures. Thus, the incentives to carry out adaptation are better aligned with individual goals, local scales and implementing units.

The Millennium Development Goals (2001), 10th periodic development plan (2002-2006), Sustainable Development Agenda (2003) and Poverty Reduction Strategy Paper (2003) are the entry-level policy protocols emphasized that a key to achieve goal cannot be possible without addressing climate change issues. Nepal began the Climate change initiatives in 2001 when the COP7 (Marrakesh Accord) helped establish the Least Developed Countries (LDC) fund, Special Climate Change Fund (SCCF) and Adaptation Fund. The process fledged once the COP 17 Parties decided to designate the Green Climate Fund (GCF) as an operating entity of the financial mechanism to fund the activities by developing country Parties. Besides, the SDG goal 13 aims to mobilize US\$ 100 billion annually by 2020 to address the needs of developing countries to both adapt to climate change and invest in low-carbon development. The roadmap to SDG 2030 commits to the development of adaptation plans for local governments, as well as on developing CSA and integrating climate change into the school curriculum (NPC, 2017). GoN has recently endorsed a Climate Change Financing Framework (CCFF) and prepared a roadmap to guide mainstreaming of climate actions into development plans and improve accountability and reporting on the effectiveness of climate investments. The roadmap further provides guidance to the sectoral ministries in SDG implementation and localization by ensuring that climate actions are well integrated into SDG based plans and monitoring frameworks at all levels (MoALD, 2018).

3.2.2 CCA governance

The First National Communication (NATCOM-1) report to the UNFCCC (2004) provided an overview of the national circumstances that reflects Nepal's capacity to respond to the problem, and describes the causes and consequences with regard to Vulnerability/Impact and Adaptation issues. Nepal submitted the biogas project in 2005 as Clean Development Mechanism (CDM) to the CDM Executive Board for Certified Emission Reductions in accordance with Article 12 of the Kyoto Protocol. Both NATCOM-1 (2004) and National Capacity Self-Assessment (2008) revealed the limited resources, technologies and policies of the country for adaptation activities. (MoPE, 2004; MoEST, 2008). Later in 2007, when the country formally submitted the funding proposal to the Least Development Countries Fund (LDCF) for the National Adaptation Programme of Action (NAPA) preparation, Nepal formally launched the process of planning for adaptation to climate change (MoFE, 2020). To identify and address the adaptation needs, the MoE, Nepal prepared the National Adaptation Programme of Action (NAPA) in September 2010 with adherence to the decision 29, COP7 (2001) and the guidance of the Least Developing Country's (LDC) Expert Group (LEG). The UNFCCC established the NAPA in 2001 to help the LDCs address their most urgent and immediate adaptation needs. NAPAs are country driven document to identify needs that respond to urgent and immediate adaptation imperatives of LDCs in order to reduce their climate change vulnerability.

Table 3. Environment, climate change and adaptation related policy milestones in Nepal

Year	Nepal actions
1973	* National Parks and Wildlife Conservation Act
1982	* Natural Calamity Act * Soil and Watershed Conservation Act
1988	* National Conservation Strategy
1989	* Master Plan for Forestry Sector
1991	* National Health Policy
1992	* Nepal signed the UNFCCC * Environmental Protection Council developed * Water Resource Act
1993	* Forest Act
1994	* Ratified the UNFCCC and entered into agreement * Implemented Nepal Environmental Policy and Action Plan (1993)
1995	* Forest Regulation * Agriculture Perspective Plan * Establishment of Ministry of Population and Environment
1996	* Environmental Protection Act, * Environmental Protection Council * Establishment of Alternative Energy Promotion Center
1997	* Environmental Protection Rules * 9 th plan (1997-2002): application of IT for disaster management
1998	* Water Supply Regulation
1999	* Local Self-Governance Act: Institutional space and support for development planning
2000	* Forest Sector Policy
2001	* 10 th plan (2002-2007) * Recognized climate change as an emerging issue * Hydropower Development Policy * National Transport Policy
2002	* Nepal Biodiversity Strategy * National report for WSSD conference, Johannesburg (2002) * National Water Resource Strategy: recognizes climate variability and its potential impacts on the country's water resources
2003	* Sustainable Development Agenda * Poverty Reduction Strategy Paper (2003) * Nepal Environmental Policy and Action Plan
2004	* NATCOM-1 2004 submitted: integrates priorities to climate change * National Agriculture Policy: no mention of climate change but recognizes the need to ensure food security * National Agriculture Policy: surveillance system for assessing the impacts of weather
2005	* National Water Plan: research and study better understand climate-induced changes and their impacts * Proposed biogas project as Clean Development Mechanism under Kyoto Protocol * Rural Water Supply Policy * Water Plan
2006	* Water Induced Disaster Management Policy * Rural Energy Policy * Nepal Biodiversity Strategy Implementation Plan
2007	* 11 th periodic plan 3yr plan (2007/8-2009/10): linked disaster and climate change * Initiation of Climate change policy formulation
2008	* National Capacity Self Assessment * National Strategy for Disaster Risk Management: Climate risk management and the need to adapt climate variability
2009	* NAPA process begins * Climate Change Council formed * Cabinet meeting at Kalapathhar, near Everest Base Camp, * Joined the UN Collaborative Initiative on REDD in developing countries * National Strategy for DRM * Urban Water Supply Policy
2010	* NAPA 2010 * Pilot Program for Climate Resilience (PPCR) * REDD Readiness Proposal * National Agriculture Sector Development Priority * Establishment of Climate Change Management Division (CCMD) * Nepal Agriculture and Food Security Investment Plan * 12 th Periodic 3 yr Plan (2010/11-2012/2013): helped develop SPCR, early warning system, water induced disaster prevention, public health, urban development
2011	* Climate Change Policy 2011 * LAPA 2011 * Climate-Resilient Planning tool and Strategic Program for Climate Resilience (SPCR)

	<ul style="list-style-type: none"> * Climate Change Adaptation and Disaster Risk Management in Agriculture: Priority Framework for Action: road map to proactive climate adaptation actions * Industrial Policy
2012	<ul style="list-style-type: none"> * CCA and Disaster Risk Management in Agriculture Priority Framework 2011-2020 * Local Disaster Risk Management Planning Guidelines (LDRMP), 2012 * Climate Change budget Code
2013	<ul style="list-style-type: none"> * 13th Periodic plan (2013/14-2015/16): green development approach, a dedicated chapter for climate change * Nepal chaired LDC group * Local governance framework * Irrigation Policy
2014	<ul style="list-style-type: none"> * NATCOM-2 2014 * Nepal Health Policy 2014 * Kathmandu declaration on financing local adaptation to climate change * Rara declaration to CC and environmental threats * NBSAP 2014-2020: climate change is considered as a cross-sectoral issue * Environment-Friendly Vehicle and Transport Policy
2015	<ul style="list-style-type: none"> * NAP process Launched * Sustainable Transport Strategy * Forest Policy * National Urban Development Strategy * National Land Use Policy * Water Induced Disaster Management Policy * Health-NAP 2015 * Agriculture Development Strategy 2015-2035 * Foreign Direct Investment Policy * Low carbon economic development strategy * SDG (2015-2030): action to combat climate change and its impacts through strengthening resilience and adaptive capacity * 8th Intl conference on CbA
2016	<ul style="list-style-type: none"> * Forest Sector Strategy (2016-2025) * Nationally Determined Contributions (NDCs) * Health Sector Strategy 2016-2020 * Renewable Energy Subsidy Policy * 14th plan (2016-2019): development through climate change adaptation
2017	<ul style="list-style-type: none"> * Forest Reference Emission Level/ Forest Reference Level (FREL/FRL) * DRR Management Act * VRA framework and indicators for NAP * Local Government Operation Act * Climate Change Financing Framework
2018	<ul style="list-style-type: none"> * Nepal REDD+ Strategy 2018 * Revision of LAPA framework, Gender and CC strategy * National Ramsar Strategy and Action Plan, Nepal (2018-2024)
2019	<ul style="list-style-type: none"> * National Climate Change Policy * Forest Act 2019 * Environment Protect Act * IPCC Working Group II meeting * LAPA framework * 15th plan (2019-2024): development through climate change adaptation

Source: WECS 2002; MoPE, 2004; WECS 2005; NPC, 2007; GoN 2008; MoE, 2010a,b; MoEST, 2012; Regmi et al., 2014; Lama, 2016; MoPE, 2016a,b; MoPE, 2017; MoFE, 2018.

Since the entire socio-economic and ecosystems are curtailed and burdened by climate change, Nepal is trying to offset the vulnerabilities and risks associated with the climate change through effective adaptation planning to field level implementation to research and communication.

Through its own initiative and other supporting institutional mechanisms, the country has initiated and supported a series of climate change adaptation focussed policies, plans, projects, programmes and practices (Figure 2). Key initiatives, such as NAPA 2010, LAPA 2011, Climate Change Policy 2011, NAP 2015 and NCCP 2019, have been instrumental in advancing the country in adaptation planning as part of development planning (GoN, 2019).

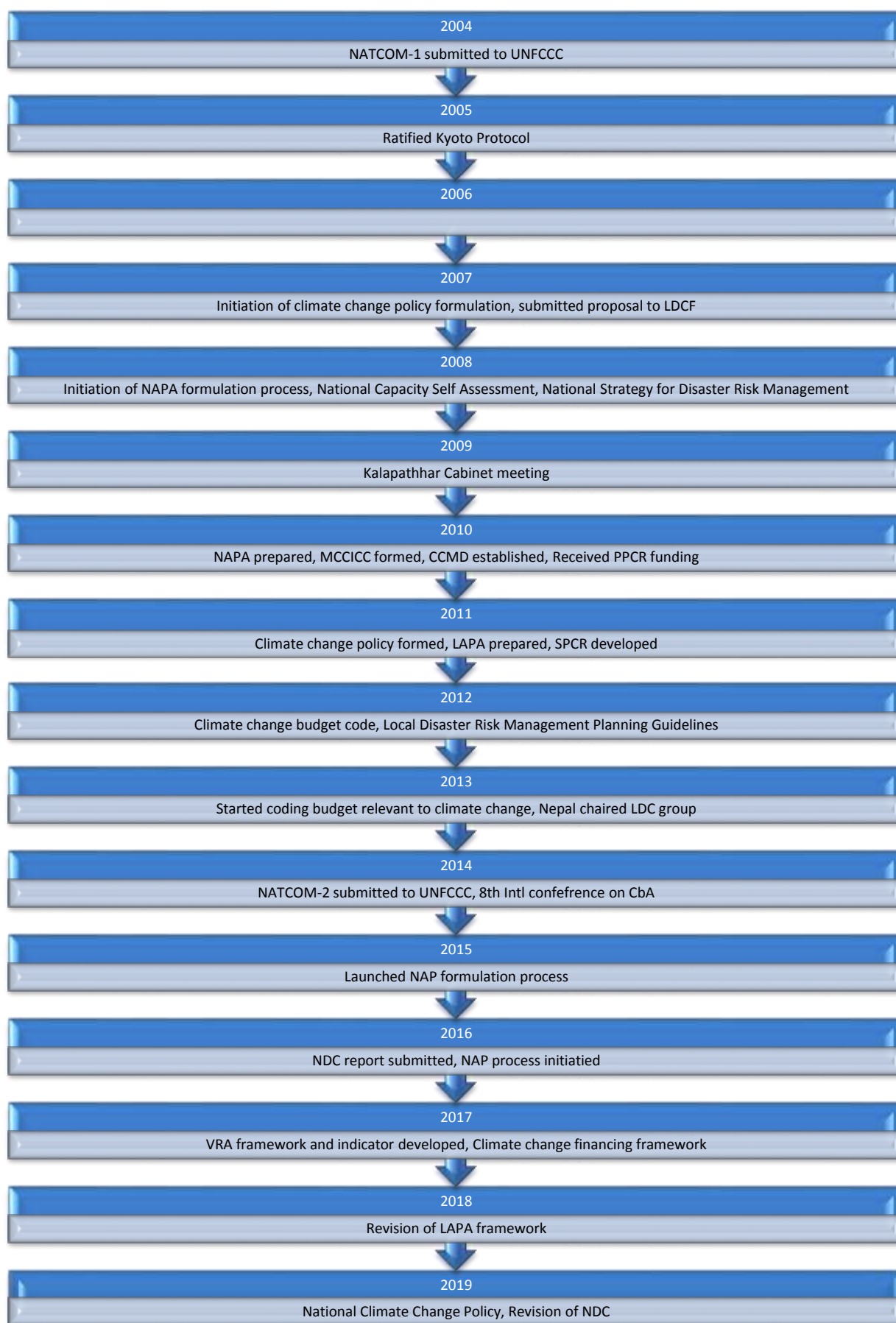


Figure 2. CCA governance in Nepal

3.2.3 National Adaptation Programme of Action (NAPA)

NAPA developed, as a requirement under the UNFCCC to access funding for identifying the most urgent and immediate adaptation needs from the LDCF. It is Nepal government's first strategic tool, which was developed to channelize the LDC fund in order to help identify the immediate and urgent adaptation needs and priorities of the country. NAPA was the first inclusive and CCA tool prepared in September 2010, as mandated by the Marrakesh Accord decision (29/CP.7, 2001). The NAPA process began in May 2009, following a rigorous consultation process with multiple stakeholders as prescribed in the annotated guidelines developed by the Least Developed Countries Expert Group (LEG). It was developed through multilevel consultations with an aim to identify needs and improve adaptive capacity of people through better governance and service delivery mechanisms, livelihoods support, access to technology and financing, and collective responses.

NAPA recognized well-defined most urgent and immediate priorities for climate change action in Nepal. It serves as a strategic tool to assess climate vulnerability and systematically respond to CCA issues through the development of appropriate adaptation measures. It has created and enhanced awareness of climate change adaptation issues at different scales and built long-term capacity through cross-sectorial and multi-stakeholder coordination. It aims to help improve the adaptive capacity through better governance and service delivery mechanisms, livelihoods supports, access to technology and financing, and collective responses. NAPA (2010) is the first document to identify areas of immediate concerns and associated estimated cost (US \$ 350 ml) of the future climate change impact address projects (Table 4).

Table 4. Nepal NAPA priority projects and estimated cost (Source: MoE, 2010a)

Priority projects	Cost US \$ (million)
1. Promoting CbA through Integrated Management of Agriculture, Water, Forest and Biodiversity Sector	50
2. Building and Enhancing Adaptive Capacity of Vulnerable Communities through Improved System and Access to Service Related to Agricultural Development	44
3. Community-based Disaster Management for Facilitating Climate Adaptation	60
4. Glacial Lake Outburst Flood Monitoring and Disaster Risk Reduction	55
5. Forest and Ecosystem Management for supporting Climate-led Adaptation Innovations	25
6. Adapting to Climate Challenges in Public Health	15
7. Ecosystem Management for Climate Adaptation	31
8. Empowering Vulnerable Communities through Sustainable Management of Water Resource and Clean Energy Supply	40
9. Promoting Climate Smart Urban Settlement	30

With influence of the NAPA 2010, Nepal released its Climate Change Policy in 2011 (GON, 2011). It was developed out of a need to address climate change impacts. It also aims to take advantage of opportunities arising from efforts to address climate change to in turn improve livelihoods, while driving climate-friendly physical, social, and economic development (Patra and Terton, 2017).

The NAPA (2010) and the Climate Change Policy (2011) both place significant emphasis on local adaptation plans, including implementing mandatory provisions to use at least 80% of their available budget for local adaptation activities. Recognizing the variability within the various communities, the GON, with the support of civil societies and organizations, designed a formal process to go beyond the NAPA and developed local adaptive plans in 2011 that addresses the needs and aspirations of remote and rural communities, and the wide range of impacts experienced from climate variability (GON, 2011). Nepal is the first country in the world to develop a formal Local Adaptation Plan of Action (LAPA) process (Peniston, 2013). LAPA is a bottom-up and inclusive approach in integrating and motivating stakeholders in CCA. The purpose of LAPA is to more effectively implement the NAPA by leveraging public participation to identify and execute local adaptation action, and to integrate climate change adaptation into sectoral plans and policies (GON, 2011).

All these policy instruments along with LAPA, coupled with growing concerns on climate change issues at national and international levels, provided ample opportunities to facilitate adaptation interventions at various levels, in a more cohesive and systematic way. Adaptation planning was further supported by the fact that Nepal is one of the nine countries originally invited by the World Bank to participate in the Pilot Program for Climate Resilience (PPCR). The GoN accepted the offer to participate in the PPCR in May 2009, and in March 2010 received a grant of \$225,000 as technical assistance (TA) to prepare its SPCR.

Through the program, Nepal developed a Strategic Program for Climate Resilience (SPCR) in 2011, which is being implemented in partnership with relevant multilateral development banks. SPCR bolstered the country's climate change response. While the NAPA identified an extensive list of immediate interventions, the SPCR focused on highest-priority risks and long-term interventions, aimed at enhancing climate resilience in Nepal (Climate Investment Funds, 2011). Building on the NAPA and LAPA, Nepal started its National Adaptation Plan (NAP) process in September 2015. The two main objectives of the NAP are to reduce vulnerability to climate change impacts by improving resiliency and adaptive capacity, and to integrate climate change adaptation into new and current policies, programs, activities, and development strategies across all sectors and levels of government.

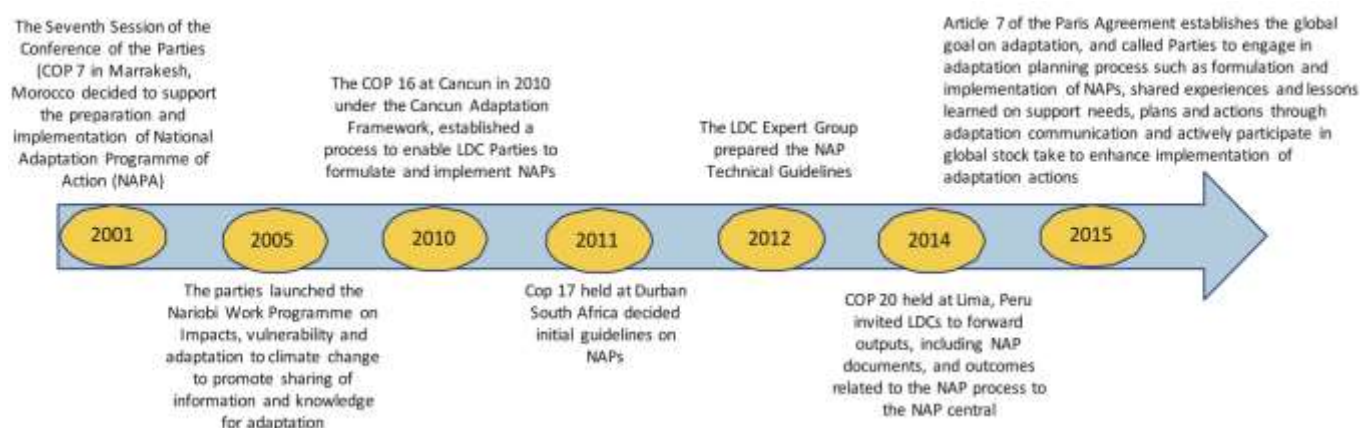


Figure 3. Adaptation evolved over time in COPs

3.2.4 National Adaptation Plan (NAP) Process in Nepal

Utilizing biodiversity and ecosystem services as a part of adaptation strategy to help people adapt to the adverse effects of climate change (CBD, 2009) is EbA, while, capacitating the countries to advance their national adaptation plan process is the NAP approach – the major two types of CCA strategies adopted by the UNEP. Former is the natural solution approach, whereas the latter is institutional development. In the context, EbA has gain importance ever since it was officially defined by the Convention on Biological Diversity (CBD) in 2009. The NAP approach was established under the Cancun Adaptation Framework (CAF) (2010) and re-emphasized in the Paris Agreement (2015). Thus, reducing vulnerability to the impacts of climate change through EbA and integrating adaptation into development planning through the NAP process is an immediate need. The NAP process enables the Parties to assess climate risks and vulnerabilities, and plan adaptation actions.

The COP17 (2011) held in Durban, South Africa issued the initial guidelines for the NAP formulation. As per the COP 16 (2010) mandates, the LEG prepared the NAP Technical Guidelines to formulate the NAP. Along with the guidelines and mandates, Nepal's NAP Process was built on the basis of the past experience with adaptation planning (GoN, 2011). About 10 government officials participated in the NAP formulation process through the regional training-workshops organized by the NAP-GSP and LEG. Later, the NAP Process was officially initiated in 2013 and approved on 18 September 2015. NAP intends to develop adaptation strategies needed, to tackle the impacts of climate change on vulnerable communities and ecosystems. Four contexts (Development planning, institutional arrangement, Climate policy and Climate finance) were assimilated while developing the NAP. The main objectives of the NAP are (i) to reduce vulnerability to climate change impacts by improving resilience and adaptive capacity, and (ii) to integrate climate change adaptation into new and current policies, programs, activities, and development strategies across all sectors and levels of government (MoPE, 2016a).

3.2.5 Recent initiatives

Over a period of two decades (2000-2020), Nepal has made a series of progress in integrating CCA in policy and planning, and implementing the CCA projects and programmes in order to reduce the vulnerability and adjust climate change effects. Reduction of impacts and or enhancement of the benefit from climate change effects were in particular sought while implementing CCA projects and programmes. Long-term commitment and capacity through cross-sectorial and multi-stakeholder coordination and collaboration is envisioned while transcending from the NAPA (2010) to NAP (2015), and to NCCP (2019). As a consequence, the adaptation needs associated with only 6 themes (related to the Agriculture and food security; forests and biodiversity, climate induced disaster, urban settlement and infrastructure, public health, water resource energy) and 2 cross-cutting themes (based on livelihood and governance and gender and social inclusion) were prioritized in NAPA (2010). However, it got advanced and set mid and long-term adaptation needs of nine themes in the NAP (2015), including those eight themes of NAPA and addition of tourism, culture and natural heritage.

Nevertheless, the tourism, infrastructure, research, technology and climate financing sectors were often ignored in earlier CC policy documents in Nepal. Against this backdrop, the NCCP (2019) has been introduced with the objective of providing policy guidance to

various thematic areas towards developing a resilient society by reducing the risk of climate change impacts. The policy sought the contributions through building the resilience of ecosystem, enhancing the CCA capacities, promoting the green economy, mainstreaming gender equality and social inclusion, incorporating climate-smart technologies and conducting research and studies on climate change for climate data availability. It further broadened the scope and integrated all nine themes of the NAP along with climate-friendly infrastructure development, technology development, research, and climate finance (Table 1). It has clearly outlined the role of federal, provincial and local governments, and emphasized that at least 80 % of the amount should reach to the local level programmes while mobilizing the received climate finance.

Table 5. Advancement in thematic coverage in NAPA, NAP and NCCP Nepal and associated coordinating ministries

NAPA 2010	NAP 2015	National Climate Change Policy 2019	Coordinating ministry
1. Agriculture and Food Security	1. Agriculture and Food Security	1. Agriculture and Food Security	Agriculture and Livestock Development
2. Climate Induced Disaster	2. Climate Induced Disaster	2. Disaster Risk Reduction and Management	Home Affairs
3. Urban Settlement and Infrastructure	3. Urban Settlement and Infrastructure	3. Urban and Rural Habitats	Urban Development
4. Public Health	4. Public Health, Sanitation and Hygiene	4. Health, Drinking Water and Sanitation	Health and Population/Water Supply
5. Forest and Biodiversity	5. Forest and Biodiversity	5. Forest, Biodiversity and Watershed Conservation	Forest and Environment
6. Water Resource and Energy	6. Water Resource and Energy	6. Water Resource and Energy	Energy, Water Resources and Irrigation
-	7. Tourism, Natural and Cultural Heritage	7. Tourism, Natural and Cultural heritage	Culture, Tourism and Civil Aviation
-	-	8. Industry, Transport and Physical Infrastructure	Physical Infrastructure and Transport/Industry, Commerce and Supplies
7. Livelihood and Governance	8. Livelihood and Governance	9. Gender, Equality and Social Inclusion, Livelihoods and Good Governance	Women, Children and Senior Citizen
8. Gender and Social Inclusion	9. Gender and Social Inclusion		
-	-	10. Awareness Raising and Capacity Development	Education, Science and Technology
-	-	11. Research, Technology Development and Expansion	Forest and Environment
-	-	12. Climate Finance Management	Finance
Assess climate vulnerability and respond to climate change adaptation issues through the development of adaptation measures	Reduce vulnerability to climate change impacts by improving resilience and adaptive capacity	Develop a resilient society by reducing the risk of climate change impacts	11 ministries work for CCA
most urgent and immediate adaptation	medium and long-term adaptation	medium and long-term adaptation	

MCCICC, formed in 2010, is composed of state and non-state actors, and operates at the executive level. At present, the Ministry of Forests and Environment is working on establishing an inter-ministerial climate change coordination committee (IMCCCC) to facilitate and support the respective ministries to integrate climate change into their development planning and budgeting processes. Apart from this, the Government of Nepal is also working on establishing a “Think-Tank Group” on climate change.

3.2.6 GESI mainstreaming

Nepal, being a signatory to various international conventions, is legally committed to gender, equality and social inclusion (GESI). So far, seven major sectoral ministries (Agriculture, Education, Forest, Health, Federal Affairs and Local Development, Urban Development, Water Supply and Sanitation) have issued and are implementing GESI policies and guidelines and, in many cases, have established dedicated units to monitor actions. In addition, the Ministry of Women, Children and Senior Citizen (MoWCSC) has almost finalized a Gender Equality Policy that will be applicable -nationwide.

GESI approach roots, in GoN discourse, first appeared during the early 1970s as a concern to ensure women’s equal access to development benefits (IDPG, 2017). With growing awareness and capacity among Nepali women, this has evolved over time. The Constitution of Nepal is a significant milestone for GESI and enshrines equal rights for women, the poor, the vulnerable and people from different social groups. The 14th three-year plan (2016/27-2018/19) recognizes that improving gender equality and addressing issues of “backward” regions, classes and communities and excluded groups requires consolidated efforts, such as targeted programs, equitable distribution of resources, and social security for poverty reduction. It acknowledges that gender equality, women empowerment and inclusion are cross-cutting themes. Gender analysis, social analysis, participatory rapid appraisal (PRA), poverty mapping and social mapping, etc. are among the tools used to identify and address the issues faced by women, the poor, the vulnerable and the excluded. Furthermore, rights-based advocacy, livelihoods development and service delivery approaches have been adopted by INGOs. To sum up, a dual approach should be taken of both mainstreaming GESI considerations into policies/programmes/projects and by targeting excluded and vulnerable groups, where needed, through GESI-specific programs/projects.

3.3 OUTPUT 1: REVIEW AND SYNTHESIZE CLIMATE CHANGE ADAPTATION IN NEPAL

In this component, Output/Work 1 of the assignment “A compilation (Compendium) of climate change adaptation measures implemented in Nepal” was carried out, followed by the detail analyses of

1. Identification and review of Nepal's climate change adaptation programmes and measures to date, based on the review of documentation (e.g. NAPA generated programmes and measures) and interviews with adaptation proponents;
2. Compilation of factsheets on each category/type of adaptation measures implemented by different agencies/projects across the country in different thematic areas at the national, provincial and local levels. The factsheet should describe the adaptation measure, the relevant thematic area, the number of beneficiaries, the adaptation results and impacts, the cost of the measure, among others (and other variables identified by the consultant);
3. Finalization of the compilation based on feedback and comments from the NAP PMU/CCMD/UNEP.

3.3.1 CCA interventions in Nepal

After consultation with CCA proponents, experts and project officials, climate change adaptation measures, projects, programs, practices have been grouped into CCA interventions.

CC adaption is a multi-sectoral approach to risk reduction. It can be classified according to climate stimuli, system and the processes or measures of climate change. It contributes to the reduction of climate vulnerability if it is embedded in the sectoral plans. Adaptation occurs against the background of environmental, economic, political, and cultural conditions, which vary substantially across regions (Fussel, 2007). Adaptation processes or measures can be reactive or anticipatory (proactive), spontaneous or planned, or distinguished in other ways (Smit et al., 2000). The adaptive measures may be further explained by the following attributes: intent, scale, timing, duration, form, scope, effect and the role of government (Smitthers and Smit, 2009) (Table 6).

Table 6. Types of Climate Change Adaptation

Attribute	Types
Intent	Autonomous ~ Planned
	Spontaneous ~ Purposeful
	Natural ~ Policy
	Active (structured) ~ Passive
Timing of actions	Reactive ~ Proactive
	Anticipatory ~ Responsive
	Ex-ante ~ Ex-post
Temporal	Immediate/short term adjustment ~ Long-term
	Tactical ~ Strategical
Spatial	Local ~ Widespread
Effect	Retreat, Accommodate, Protect
	Prevent, Tolerate, Spread, Change, Restore
Performance	Cost effective, efficient, implementable, equity

Process	Community based Adaptation (CbA), Ecosystem based Adaptation (EbA), Climate Smart Adaption (CSA), Climate Resilient Development Planning (CRDP) and Research and Knowledge Management
Actors	Community level, organizational and governmental

While integrating CCA in policy, plan and programmes in the light of prioritized adaptation needs sorted out by NAPA, NAP and NCCP, various CCA interventions are being implemented in Nepal that helps advance CCA and limit the vulnerabilities and risks of climate change. The interventions echoed the tenet of country's development plans, climate change policy and combating measures/needs outlined in NAPA 2010, NAP 2015 and NCCP 2019, as well as country's international commitments, including its Nationally Determined Contribution (NDC) and COPs, were taken into consideration for further assessment in this assignment. As guided by the NAPA and with pertaining to the NAP process (2015) and NCCP (2019), there are several CCA interventions in Nepal ranging from local to national, short-term to strategic long-term, reactive to proactive, preventive to restoration and community-based to development planning, etc. (Table 7). These three major types (community-based practices, government led programmes and development partners funded projects) are based on actors/implementation.

- i) promoting community-based CCA practices,
- ii) integrating CCA in government development plans, policies and programmes, and
- iii) facilitating projects from development partners

3.3.2 Community-based climate change adaptation practices

Local climate change adaptation practices constitute local knowledge and measures, as well as autonomous and planned interventions directed at reducing risks and enhancing the resilience of vulnerable households and communities with respect to their livelihoods and the economic sector on which they depend for their well-being (Regmi and Pandit, 2016).

Communities manage risks associated with perceived climatic variability through a range of initiatives, including crop substitution, crop diversification, migration, etc. Adaptations in cropping pattern and vegetation management as local strategies against climate-induced hazards (landslides, floods, and droughts) are common in mid-hills (Dhungana et al., 2020). Nepali villagers grow shrubs and grasses in and around their hill settlements to shore up the soil and protect their homes and community properties from floods and landslides, which are often triggered by heavy rainfall. They rarely plant large trees close to their homes with a fear that it might fall and damage homes (Thapa et al., 2008; Helvetas, 2011). In addition to these, other local measures that are considered climate-smart and resilient-advanced interventions are mentioned in Table 8. While practicing these activities with indigenous and traditional knowledge, weather-smart, climate-resilient, and technology-friendly CCA measures are urgently needed. For any adaptation and resilience-building activity to succeed, it is necessary to customize the adaptation plans and contextualize the whole process to a particular culture, society, location and values that are interwoven with local ecosystems and/or watersheds. Strengthening resilient and adaptive community-based practices is crucial for mainstreaming climate change risks management in Nepal's development plans, since most of the area of the country is remotely located, inaccessible and impaired by limited development. Thus,

nature-based strategy ensures sustainable adaptation and development at a much lower cost.

Table 7. Adaptation practices at community level

Category	Adaptation practices
Sustainable Agriculture Management	1) Crop substitution, crop diversification, migration (Pokharel and Byrne, 2009; WFP and NDRI, 2009; Gurung et al., 2010); 2) Crop intensification (Singh, 2008); 3) Flood resilient crop varieties (Bartlett et al., 2010); 4) Crop rotation, bio-intensification (Thapa et al., 2018); 5) Plastic tunnels, climate tolerant crop varieties, promotion of arid crops like watermelon, cucumber, pumpkin and gourds, botanical pesticides combined with integrated pest management, introduction and promotion of pests and disease resistant varieties, promotion of mulching to cover the land with plastic sheets to minimize water from evaporating, improvement of existing gravity irrigation systems, diversifying the farming system, cultivating drought resistant crops in areas that experience decreasing rainfall, the adjustment of planting dates, altering cropping location, improved land management (UNDP, 2018).
Way further	* Increase local storage facilities and food stocks (WFP, 2010) * Insurance scheme (Moench, 2010), Organic farming
Sustainable Livestock Management	1) Fodder banks and storage of dried fodder to provide a steady supply of fodder during droughts and floods, transportation facilities for produce to markets; 2) introduction and promotion of improved breeds (cross breeds) of animals through artificial insemination for higher production of milk and meat; 3) cattle shed management; 4) promotion of poultry farming
Way further	* Integrated management of livestock and agriculture, rotational grazing, preparedness for diseases outbreaks
Sustainable Forest Management	1) Agroforestry and measures to reduce forest restoration, water recharge zone creation, scientific forest management, systematic management of sand and gravel; 2) Incorporation of climate change measures in forest operational plans; 3) Rotational grazing, rotational harvesting; 4) Switching cooking and heating in alternative energy options
Way further	* Protect endangered habitats and wildlife * Multiple use forest management can yield variety of ecosystem goods and services, including non-timber forest products such as medicinal herbs, clean water, and carbon sequestration that can aid adaptation and poverty reduction outcomes.
Sustainable Water Management	1) Drip irrigation (ANUKULAN); 2) Grow shrubs and grasses in and around their hill settlements to shore up the soil and protect their homes and community properties from the flash floods and landslides; 3) Mauja, Argali, Raj Kulo irrigation systems (MOSTE, 2015); 4) Construction of water harvesting structures and water channels to increase and ensure better access to water for farmers; construction of river training structures such as gabion wire with boulders, dykes, dams, diversion canals to control floods; snow and rain water harvesting for irrigation and drinking water; management of spring sources for irrigation and improvement of channels, construction of conservation ponds.
Way further	Drip irrigation, drought tolerant crops (Krishnamurthy et al., 2013)
Disaster Management	1) Bamboo plantation, drought resistant tree plantation, bioengineering (Dhungana et al., 2020); 2) Climate field schools, Participatory hazard mapping, early warning in mobile apps; 3) Community based risk reduction; 4) Plantation of Amriso, Babiyo, Bamboo with good soil stabilizing properties
Way further	* Implementation of early warning system (Moench, 2010); 2) slope stabilization (Krishnamurthy et al., 2013) ; 3) Weather smart technology (Thapa et al., 2018); 4) Long term adaptation requires assessment of local geology, settlement and historical disaster trend, indigenous and local practices of older generations, and local technology and materials.
Sustainable livelihood	1) Additional income sources, off-farm activities; 2) Water mills (Paani ghattas); 3) Ecotourism

3.3.3 Government led CCA programmes and associated supports

A multi-stakeholder forum “*Sagarmatha Sambaad*” was initiated to deliberate the discussion on ‘Climate Change, Mountains and Future of the Humanity’, yet its continuity was interrupted due to the unprecedented crisis of Covid-19. The Ministry of Forests and Environment (MoFE) organised a national workshop on environment conservation and climate change on June 5-7, 2019 in Nepalgunj. The local government of Sindupalchowk district organised the National Climate Change Conference in Gufadanda, Melamchi-9, Sindhupalchowk on 1 January, 2020. A synthesis report on the implementation of the Gender Action Plan was shared at COP25 (Madrid, 2019). The ODI undertook an analysis of planned interventions in the water sector as outlined in the NAPAs of LDCs. Moreover, efforts are underway to benefit from carbon trading and climate change mitigation.

The MoFE has started to develop the Gender and Climate Change Strategy and the Action Plan and guidelines for integrating climate change in the planning and budgeting process. Likewise, the Ministry of Finance (MoF) has also established the Climate Finance Unit to strengthen national capacity to absorb and manage climate financing (mostly targeted to GCF.) MoF, as the Designated National Authority (DNA) to GCF, has already recommended two national institutions - Alternative Energy Promotion Centre (AEPD), and Nepal Trust for Nature Conservation (NTNC) for the GCF accreditation as the National Implementing Entity, and the GCF readiness project (2016-2018) provided the technical support for this process. AEPD is mandated to promote alternative energy technologies, while NTNC is working in the field of nature conservation promoting EbA measures. Likewise, the Ministry of Agriculture and Livestock Development (MoALD) has been piloting the integration of climate change in agricultural planning and budgeting at the national and sub-national levels. The ministry has been promoting technology and practices toward CSA: Good Agriculture Practice (GAP) for Disaster Risk Management (DRM) and CCA options in cropping sector; Releasing and growing Stress tolerance crops (Rice, wheat and maize) and vegetable varieties (MOALD, 2019). Good Agriculture Practices (GAP) is a voluntary standard for food safety, quality control, environment-friendly and worker welfare-friendly standard, which ultimately contribute for sustainable agriculture.

Government led CCA programmes

Nepal was selected as one of the nine pilot countries for the Pilot Program for Climate Resilience (PPCR) in May, 2009. This is the programme of the Climate Investment Fund (CIF) to support implementation of country-led programs and investments (<https://www.climateinvestmentfunds.org/country/nepal/nepal-ppcr-programming>). The Climate Change Program (CCP) Coordination Committee, under the MoSTE, coordinates and manages PPCR projects/results. The highest priority risks identified during the SPCR preparation are (i) quantity and quality of water, (ii) food security, and (iii) ecosystem health, based on which 5 investment components/projects were proposed (Table 8).

Table 8. Projects identified by SPCR

Component	Project	Dev. partner	Implemented by
PPCR1	Building Climate Resilience of Watersheds in Mountain Eco-Regions (BCRWME)	ADB	MoFSC
PPCR2	Building Resilience to Climate-Related Hazards (BRCH)	WB	DHM
PPCR3	Mainstreaming Climate Change Risk Management in Development (MCCRMD)	ADB	MoAD/MoSTE

PPCR4	Building Climate Resilient Communities through Private Sector Participation (BCRC-PSP)	IFC	MoFSC, MoSTE, MoAD
PPCR5	Enhancing Climate Resilience of Endangered Species	WB (Pulled out)	MoFSC

Perhaps the most significant International funding to climate change initiative to-date is the Strategic Program for Climate Resilience (SPCR), which is being implemented through the PPCR of the WB- administered CIF. The SPCR is the most substantial externally supported climate change initiative for Nepal, and together with three additional projects supported by the DFID, the EU, and the UNDP, it constitutes MoSTE's Climate Change Program (CCP) to support implementation of the NAPA priority profiles (Table 9). Component 3 of PPCR, Mainstreaming Climate Change Risk Management in Development (MCCRMD) developed knowledge-management tools suitable for CCA. Output 2 documented traditional or indigenous adaptation practices in Nepal, including those of women and disadvantaged groups (ADB, 2011, MoSTE, 2015).

In 2010, a project jointly funded by the GEF operated LDC Fund, the UNDP, DFID and the Embassy of Denmark helped the GoN for the preparation of the NAPA, development of the National Climate Change and Knowledge Management Centre (NCKMC) and MCCICC. Established in 2010, the NCKMC is a collaborative effort of the Nepal Academy of Science and Technology (NAST) and MoSTE (now MoFE) under the NAPA project. The NCKMC aims to serve as a dedicated institutional arrangement for managing climate change knowledge in Nepal, through providing a platform for coordinating and facilitating the regular generation, management, exchange, and dissemination of climate-related knowledge and capacity development services to a multi-stakeholder climate change communities (Fisher and Slaney, 2013). The Scaling-Up Renewable Energy Programme for Low Income Countries (SREP) is another significant externally supported initiative in Nepal. This program (2014-2019) is a part of the Strategic Climate Fund, a multi-donor Trust Fund within the CIF support (US \$ 7.9 ml) implemented by the AEPC. Its objective is to support renewable energy and provide access to modern sustainable energy. SREP Nepal supported extended biogas project to promote large off-grid biogas.

As part of the Paris Agreement (2015), the GCF was requested by the CoPs to materialize support for the LDCs and other developing country Parties for the formulation of NAP. As requested, the GCF Readiness and Preparatory Support Programme is implemented by the Ministry of Finance (MoF), with financial support (US \$ 1.5 ml) from the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and the technical support from the UNDP and the UNEP. This project (07.2016-04.2018) supported the Government of Nepal (GoN), specifically the MoF, and related stakeholders in strengthening the national capacities to effectively and efficiently access, manage, deploy and monitor climate finance from the Green Climate Fund (GCF) and prepare proposals. Under the GCF's RPS Programme, Nepal received a grant of US \$ 3 ml via the UNEP for preparing country's National Adaptation Plan (NAP). This is also known as Asia's first GCF-financed 3-yr project approved in November 2018. This 3-yr project will support Nepal to advance its process to formulate and implement its NAPs – particularly focusing on climate-sensitive sectors, such as agriculture, infrastructure resilience and food security. GCF approved US\$ 39.3 million funding for the second project builds resilience and mitigates the effects of climate change to the benefit of nearly one million people of Churia region of Nepal. MoFE, Nepal is co-funding the initiative – adding a further US\$ 8 ml. FAO

and MoFE will implement the work over a period of seven years. Both projects address eight strategic impact areas of the GCF (GCF, 2015).

3.3.4 CCA Projects by development partners

Nepal has been successful in accessing climate finance from the UNFCCC, including the LDCF and the AF. Outside the UNFCCC, a number of bilateral and multilateral development partners have supported implementation of adaptation projects in Nepal. Notable among these are the Nepal Climate Change Support Programme (NCCSP), funded by the U.K. Department for International Development (DFID), the European Union and UNDP (MoFE, 2018). Starting in 2011 and currently implementing 100 LAPA in 14 districts, MoPE is the leading agency and MoFALD is supporting the NCCSP project. NCCSP is now at the second phase of its implementation covering 28 municipalities (Palikas) of the same districts in Province No. 5, 6 and 7. UK Aid/DFID and European Union are the funding organizations with a total contribution of 14.6 ml pounds, out of which DFID contributes 7 ml and EU contributes 8.6 ml Euros. UNDP manages 2.8 ml pounds through the technical assistance of the government at the central, regional and local level. In addition, UNDP funds US\$ 0.3 ml. Other projects run by the UNDP and MoSTE are on EbA and community-based GLOF risk reduction (Table 9). All the SPCR projects (Table 8) and the collaborated projects (Table 9) were important for vulnerable people of Nepal to address climate change (Maharjan, 2014).

Table 9. Projects identified by SPCR

Component	Project	Development partner	Implemented by
NCCSP	Nepal Climate Change Support Program	DFID, EU, UNDP	MoSTE, MoFALD
UNDP1	Ecosystem-based adaptation program (EbA)	UNDP	MoSTE
UNDP2	Community-based flood risk and GLOF risk reduction program	UNDP	MoSTE

The Nepal Initiative for Climate Change Adaptation (ICCA), funded by the United States Agency for International Development (USAID) (US \$ 2 ml), started in March 2012, provided support to the Nepalese government for local adaptation planning and aims to develop sustainable livelihood opportunities for over 20,000 smallholder families through the sustainable use and management of non-timber forest products, high-value crops, coffee, and essential oils (USAID, 2013). Additionally, the Adapting to Climate Induced Threats to Food Production and Food Security on the Karnali Region of Nepal, implemented by the World Food Programme (WFP) (2018-2022), seeks to increase the adaptive capacity of climate-vulnerable, food-insecure poor households by improving the management of livelihood assets and natural resources in the Karnali districts of Nepal (Adaptation Fund, 2015).

A Climate change project funded by the ADB, “Strengthening Capacity for Managing Climate Change and Environment in Nepal (2009-2012)” and implemented by the WWF US, Practical Action and MOSTE, Nepal was to develop the governments’ capacity and mainstream the climate change agendas in national planning and programmes. In 2016, DFID/ACT/OPM and Practical Action supported the initial NAP process. DFID/OPM/PIF supported the VRA to assist Nepal NAP process. FAO/UNDP implemented NAP-Ag project that piloted the VRA framework at the national and local level (2016-2018).

DHM/ICIMOD supported the CC trend analysis and scenario development. MoFE in collaboration with ICIMOD, hosted the IPCC Working Group II meeting, from 14 to 19 July 2019. The meeting brought together more than 260 authors and IPCC Bureau members from more than 60 countries. Government shared the HKH Monitoring and Assessment Report (2018) in July 2019 at the Permanent Mission of Nepal to the United Nations in New York.

The Ministry of Forests and Environment is in the process of preparing the National Adaptation Plan (NAP), as per the mandate of the National Climate Change Policy 2019, Paris Agreement Road Map, and Transparency Framework. The NAP process assists in mainstreaming climate change adaptation into development policies, plans and strategies. In advancing the adaptation plan processes, the government recognizes the necessity to involve various sectors in effective multi-sectoral planning and acknowledges the vital role of communities in addressing climate change and other development issues. Involvement of private sectors was sought in the project, “Building Climate Resilient Communities through Private Sector Participation”, one of the initiatives under Nepal’s SPRC, which support the capacity of farmers to adopt improved seeds and climate-resilient practices and technologies. The long-term goal of the project was to build a sustainable business case for private actors to invest in climate-resilient agriculture practices beyond the projects’ life (Climate Investment Fund, 2014).

There are several other projects that helped to drive the NAP process. Adaptation in the agriculture sector is a major focal point among national projects. Noteworthy project, includes the *Anukulan*: Driving small farmer investment in climate-smart technologies project, aiming to help 500,000 rural Nepalese build resilience to climate change risks, such as floods and drought. It helps smallholder farmers take advantage of economic opportunities and investments in climate-smart technologies, such as drip irrigation, conservation agriculture, essential oil production, multiple-use water systems, and community-based renewable energy (Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED-ANUKULAN).

Another project is the Adaptation for Small Holders in Hilly Areas Project (ASHA), implemented in seven mid-western districts of Nepal namely, Dailekh, Kalikot, Salyan, East Rukum, West Rukum, Jajarkot and Rolpa as these districts are most vulnerable to climate change due to social, economic and geographical factors. Projects promoting climate-smart technologies, such as electric vehicles, solar, micro hydro etc. are also being run in order to reduce climate risks. International and local non-governmental organizations have also been active in implementing adaptation actions (Bishokarma, 2017). Private Sector Company, Sundar Yatayat Pvt. Ltd., commenced the operation of electric buses from September 08, 2019. Beside adaptation, the country has also adopted mitigation option to combat climate change impacts. The initiatives towards mitigation includes: harnessing hydropower potential, deploying renewable energy sources, maintaining forest at 40 percent of total land, reducing dependency on fossil fuels and, increasing electric and hybrid vehicles. Similarly, REDD readiness activities that intends to achieve sustainable management of forests, carbon sequestration and adaptation co-benefits echo climate-smart advances.

3.3.4.1 Types of CCA interventions by process

With adherences to the NAPA and prioritized sectors of the NAP process and NCCP 2019, the CCA interventions in Nepal were ranged from supporting community-based adaptation (CbA) to enabling climate resilient development planning (CRDP) or low-carbon climate-resilient development (LCRD). Other interventions augmenting adaptive capacities are possible through fostering climate-smart agriculture (CSA), enhancing nature/ecosystem-based adaptation (EbA) and carrying out research, quality data and knowledge management (RKM) (Table 8). CbA is more frequent as higher investment is in place on communities and their socio-economic systems. Out of 73, there are 46 projects that is centered on community-based adaptation for building community resilience, and reducing climate vulnerabilities and risks (Figure 3).

As the Climate Change Financing Framework (CCFF) (2017) and the NCCP (2019) pushed for the integration of CCA interventions into development planning, projects enabling institutions and policy instruments, as well as sustainable climate finance are well advanced. When the NAP process initiated in 2015 accommodates a larger space for enabling planning and implementation of adaptation at the country level, within the broader development context, it can produce, countless outputs ranging from local actions to national policy reform to a series of plans containing adaptation priorities and strategies for implementation. There are 31 (21%) projects (out of 73) aiming at integrating and mainstreaming climate agendas into development planning (Figure 4).

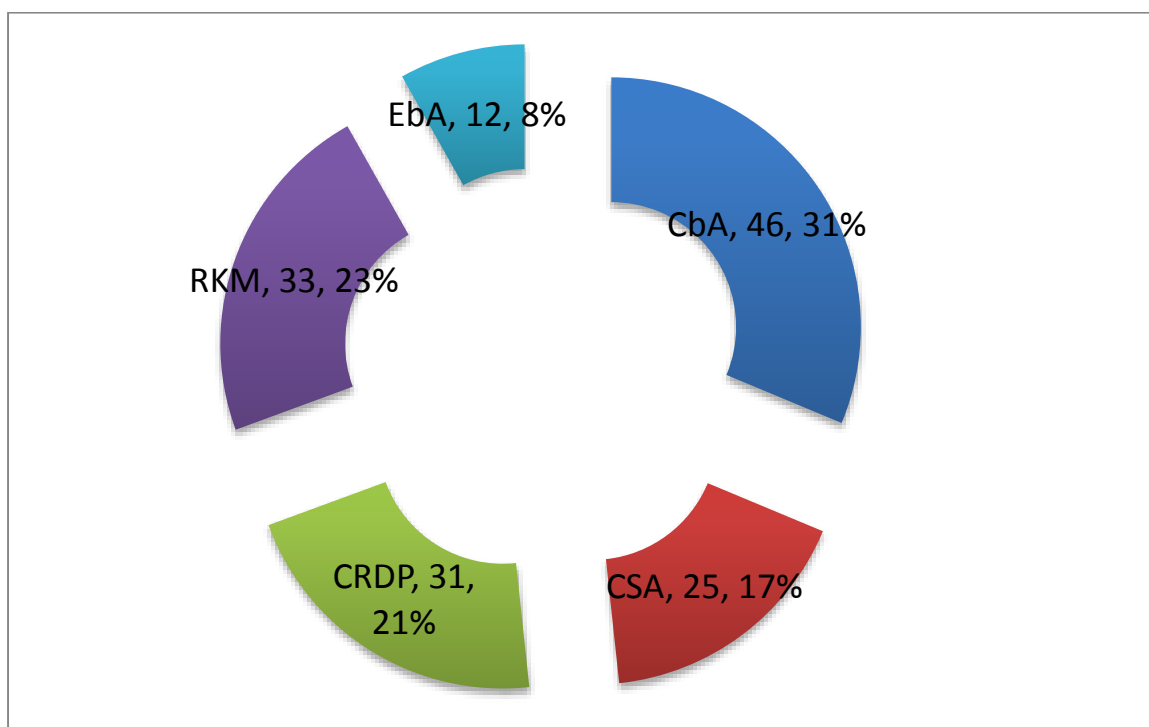


Figure 4. CCA project types in Nepal

3.3.4.2 CCA projects with respect to sectors/themes

CCA projects in Nepal were primarily identified through a review of the websites of UN agencies, multilateral development banks, bilateral development agencies, and national and international government organizations. All the relevant projects were captured in a database and classified according to the sectors worked, type of project and area(s) of focus. This present review identified 73 significant ongoing or recently completed projects that aimed to support CCA in Nepal.

The projects focuses on a wide range of sectors, though the primary emphasis is on agriculture, food security, governance, and livelihood often combined with awareness raising and capacity development and disaster risk reduction and management. As a result a large number of projects (55) falls under the Awareness Raising & Capacity Development sector. However, the Forest & Watershed Management, Water & Energy and other priority sectors are being less addressed (Figure 5). A review carried out by the Patra and Terton (2017) revealed the largest investment was on capacity strengthening and awareness raising. Similar accounts of the largest number of projects were on the capacity strengthening and awareness raising activities between 1997 and 2010 (WB website, Bird, 2011). In the other hand, projects addressing the vulnerabilities and risks associated with climate change through research and technology adoption were quite low (11). However, the current need on investing on research on quality data generation and early warning management is quite imperative (Patra and Terton, 2017). Project to improve vulnerabilities related to human health (WASH) and settlements were underemphasized, coupled with a less number of projects on climate finance and private sector involvement. Yet the projects addressing the susceptibilities of the tourism and culture should be initiated, and those of industry and transport, forestry and finance needs to be increased. Private sector is the engine of growth, and the government could consider access to national and international private finance in the form of equity or other instruments to incentivize private sector investment in Nepal's climate-resilient pathway (Sharma, 2014).

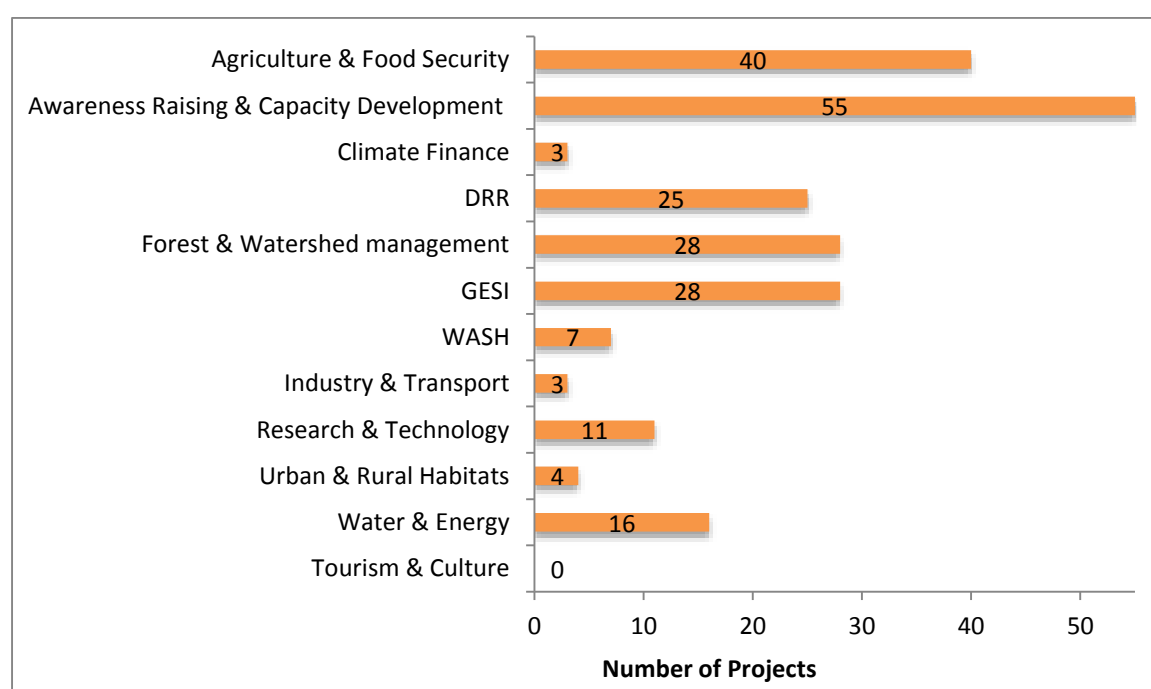


Figure 5. Number of CCA projects across 12 sectors identified by NCCP 2019 (N = 73).

3.3.4.3 Distribution of CCA projects at spatial scale

Although the NAPA, NAP and NCCP priority sectors were echoed in the current CCA projects, the distribution of projects was inconsistent with the district vulnerabilities as outlined in NAPA 2010. There are nine very high vulnerable districts and among them Dolakha, Ramechhap, Jajarkot, Mugu and Lamjung are rural hilly-mountain districts that possesses 2, 3, 7, 6 and 5 projects, respectively.

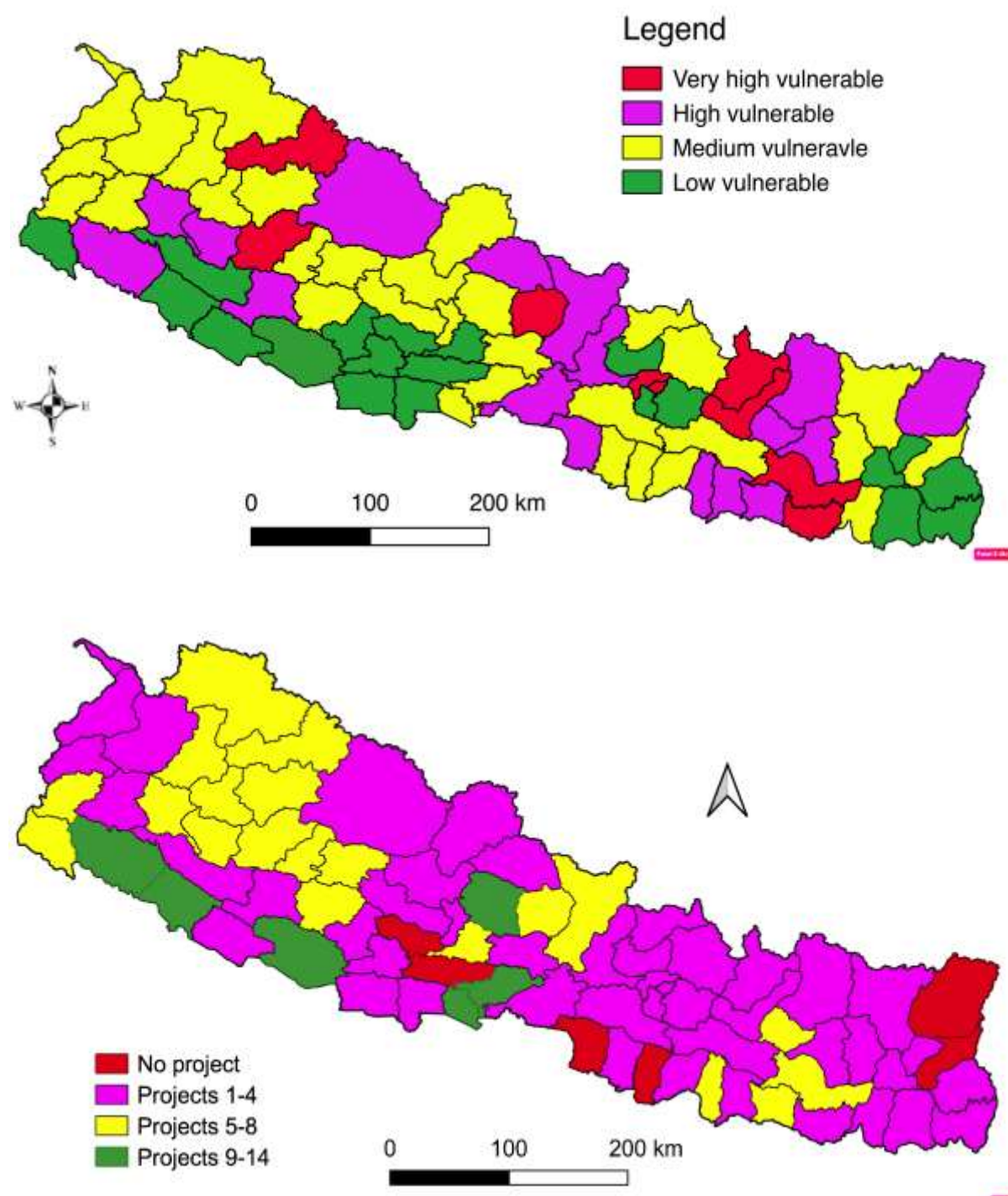


Figure 6. Climate vulnerable districts of Nepal (MOPE, 2010a) (above)

Figure 7. Number of CCA projects in districts (N = 73) (below)

As NAPA mapped the climate vulnerability in 2010 on pre-federal structure, we also followed the same for consistency and convenience. Of the 75 districts (pre-federal structure), there are 6 districts Gulmi, Palpa, Panchthar, Parsa, Rautahat, Taplejung that did not receive any CCA investment so far, however, they were categorized as highly vulnerable. Bardiya is the only district, which has the highest number of projects (14); nonetheless, it is a low climatic vulnerability district (Table 10). These discrepancies need to be resolved while advancing the NAP process in Nepal.

Table 10. Distribution of climate vulnerability and CCA projects in districts

Number of Projects	Vulnerability				
	Very High	High	Medium	Low	Total
0		Parsa, Taplejung	Panchthar, Rautahat	Gulmi, Palpa	6
1		Dhading	Baglung, Bara, Bhojpur, Darchula, Makwanpur, Myagdi, Sankhuwa, Sarlahi	Arghakhanchi, Dhankuta, Ilam, Jhapa, Kavre, Pyuthan, Tehrathum	16
2	Saptari, Dolakha	Khotang, Solu	Baitadi, Sindhuli, Sunsari	Morang, Rupandehi	9
3	Bhaktapur, Ramechhap	Chitwan, Dhanusa, Manang, Salyan	Bajhang, Doti, Rasuwa	Banke, Kapilbastu, Lalitpur, Nuwakot, Surkhet	14
4	Kathmandu	Dolpa	Mustang, Parbat, Sindhupalchok		5
5		Okhaldhunga	Bajura, Dadeldhura, Tanahun	Kanchanpur	5
6	Lamjung, Mugu	Gorkha, Mahottari	Humla, Jumla, Rukum	Syangja	8
7	Jajarkot, Udayapur	Acham	Kalikot, Rolpa		5
8		Dailekh, Siraha			2
9			Kaski		1
10		Kailali	Nawalparasi	Dang	3
14				Bardiya	1
Total number	9	17	29	20	

3.3.4.4 Distribution of CCA projects at time scale

Both international and national investments have been increased overtime ever since climate change issues has been realized as a major challenge. In Nepal, climate change project has been started from 1997. Between 1997 and 2010, the government of Germany committed Nepal five projects worth of UD \$ 40.2 million (WB, nd; Bird, 2011). Present assessment focused on projects implemented between 2010 and 2019. The assessment revealed that there were 73 project heads and their distribution overtime was bell-shaped i.e. the maximum number of projects (37) were reported in 2015, and it gradually declined after attaining peak. The projects were spanned from one year to multiple years and they significantly overlapped between 2011 and 2020 (Figure 8).

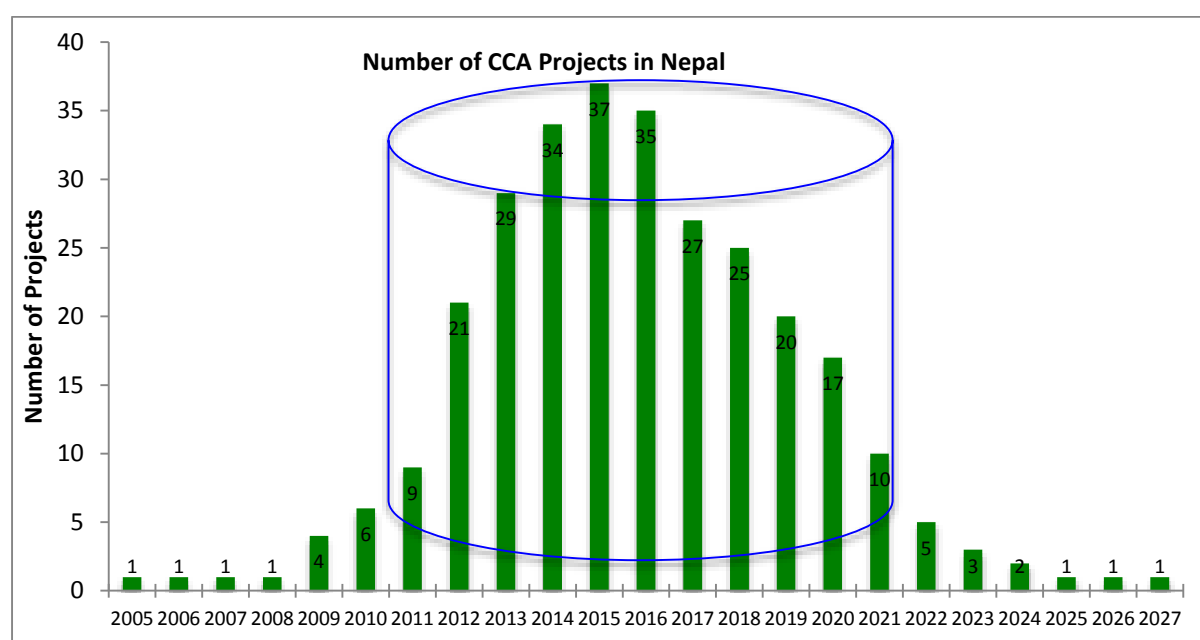


Figure 8. Year-wise number of CCA projects in Nepal (N = 73).

3.3.4.5 Institutions work on CCA in Nepal

Immediately prior to the UNFCCC (COP 15), a high level Climate Change Council, a 25-member apex political body was constituted in 2009, under the chairperson of the Rt. Hon. Prime Minister to develop climate change as a major theme of the national development and provide overall guidance in CCA (MoEST, 2012). During the NAPA process in July 2010, the Multi-Stakeholder Climate Change Initiatives Coordination Committee (MCCICC) was formed under the MoE to serve as a key national platform for ensuring regular dialogue and consultation on climate change-related policies, plans, finances, programmes, projects and activities. The GoN established the Climate Change Management Division (CCMD) to ease the CCA planning and to advance policies and plans on climate change (ACT and Practical Action, 2017) and to coordinate all climate change-related projects implemented by governments, donors, multilateral development banks and other agencies. The PMU works with the support of climate change-related projects to oversee externally financed initiatives, such as the SPCR.

The establishment of the REDD Forestry and Climate Change Cell at the MoFSC, the promotion of clean and renewable energy for low carbon emissions, and piloting of REDD+ in three watershed areas are some other joint efforts of the government to mitigate and adapt to climate change. MoAD is the main government authority responsible for agriculture-related CCA and development programmes and projects. Departments such as the Department of Agriculture, Department of Livestock Services and NARC are the implementing arms of MoAD, delivering services. Programmes related to forestry are covered by the Ministry of Forests and Soil Conservation (MoFSC). The DHM is a key department for climate change-related action under the Ministry of Energy, Water Resources and Irrigation. The DHM is the National Focal Point for the IPCC. In addition, the AEPC is a semi-autonomous agency under the same ministry and is the national institution focused on promoting climate resilience. AEPC is a GCF accredited national implementing entity. The NPC is responsible to screen development plans and programs and, since 2011, has had the added responsibility to ensure that such plans and programs are climate-resilient. To address this, the NPC, now, has a climate resilient planning tool (2011) in place. The programs and budgets for climate change-related activities prepared by sector ministries such as the Forests, Agriculture, Irrigation, Energy and Local Development, are endorsed by the NPC, and then the associated budgets are submitted to the Ministry of Finance. The list of concerned ministries for CCA is given in Table 5.

Moreover, the Climate Change Network Nepal which was established with the support of WWF Nepal, Winrock International and other organizations, showcases about two dozens of climate change actors working in building climate-resilient societies and development plans in Nepal. Since then, there are a number of several national civil society organizations, national and international organizations dedicated in working on climate change (CPEIR, 2011). With some 850 NGO members in more than 90 countries, Climate Action Network South Asia works to promote government and individual actions to limit human-induced climate change (<https://pubs.iied.org/pdfs/10058IIED.pdf>). Altogether, there are 18 International group members

(https://www.undp.org/content/dam/nepal/docs/generic/GESI%20framework%20Report_Final_2017.pdf) dedicated for the GESI. Most of the international institutions (UNDP, UNEP, USAID, GCF, etc.) executing CCA projects are public. The GoN has also developed several programmes and projects in order to opt CCA practices at community level (Selvaraju, 2014). The institutions involved in CCA in Nepal and their level is given in Table 11.

Table 11. List of organizations on CCA in Nepal

International (Public)	International Private	Regional	National (Public)	National	Local/Community
Action Aid, ADB, AF, AusAid, CCAFS, CGIAR, CIF, Cyprus, CYMMIT, DANIDA, DFID, EU, FAO, FINNIDA, GCCA, GCF, GEF, GIZ, IDRC, IFAD, IKI, IUCN, JICA, KIB, LDCF, NORAD, Red Cross, Save the Children, SIDA, SDC, SNV, TMI, UK Aid, UNDP, UNEP, USAID, WB (IDA), WFP, WHO, WWF	BMUB, BMZ, CARE, CDKN, HELVETAS, iDE, IMF, OXFAM, PLAN, Practical Action	ICIMOD, LIBIRD, RECOFTC	AEPC, AFU, DADO, DHM, DLSCO, DNPWC, DOA, DOF, DSCWM, FECOFUN, ISET Nepal, KMC, KVDA, MOAD, MOFAGA, MOFE, MOALD, MOSTE, NARC, NAST, NPC, NHRC, NTNC, TU	ADRA, BCN, ECARDS, ENPRED, FORWARD, MDO, NDRI, NEC, NEWAH, NTAG, PRC, RRN, RIMS, Rupantaran, SAPPROS	CFUGs, Cooperatives, Dalit Organizations, Farmers group, Mother groups, Saving and Credit groups, WUAS, Youth clubs

Source: CIAT, World Bank, CCAFS, LIBIRD 2017 and MoFE, 2018; CPEIR, 2011, Selvaraju, 2014, present study, <http://www.prc.org.np/uploads/resources/U4Fa-N2ChfRZLERGVbMuRIE91odKEIo-.pdf>

Theme wise distribution of the organizations is as follows.

Table 12. Distribution of organizations according to the theme

Forest, Biodiversity & Watershed Management	AFU, BCN, AusAid, DNPWC, DOF, FECOFUN, MOSTE, NAST, NPC, NTNC, TU, MDO, Rupantaran, CFUGs, ICIMOD, LIBIRD, BMUB, BMZ, CARE, HELVETAS, IMF, PLAN, Practical Action, ADB, DANIDA, DFID, EU, FINNIDA, GCCA, GCF, GEF, GIZ, IUCN, LDCF, NORAD, SIDA, SDC, TMI, UK Aid, UNDP, UNEP, USAID, WB, WWF
Agriculture & Food Security	AFU, IFAD, FORWARD, CGIAR, DADO, DOA, MOAD, MOFAGA, NARC, NPC, TU, RRN, Rupantaran, Cooperatives, Farmers groups, Saving and Credit groups, ICIMOD, LIBIRD, HELVETAS, iDE, IMF, OXFAM, PLAN, Practical Action, ADB, CIF, DANIDA, DFID, EU, FINNIDA, GCCA, GCF, WFPGCCA, GIZ, IDRC, IFAD, IKI, JICA, LDCF, SIDA, SDC, TMI, UK Aid, UNDP, UNEP, USAID, WB
Water & Energy	AEPC, DHM, DSCWM, ISET Nepal, KVDA, MOSTE, MOFAGA, NAST, NPC, TU, NEWAH, Farmers groups, WUAS, ICIMOD, CDKN, HELVETAS, iDE, IMF, PLAN, Practical Action, ADB, DFID, EU, IDRC, GCCA
WASH	FORWARD, OXFAM, KVDA, NHRC, NPC, TU, NEWAH, Dalit organizations, Mother groups, Youth clubs, HELVETAS, IMF, PLAN, Practical Action, ADB, EU, IDRC, GCCA, WHO, WB, Save the Children, UNDP
DRR	FORWARD, OXFAM, DHM, ISET Nepal, MOSTE, MOFAGA, NAST, NPC, TU, ICIMOD, CDKN, HELVETAS, IMF, PLAN, Practical Action, ADB, DFID, EU, IDRC, GCCA, UNDP, UNEP, WB, JICA

Box 2. ADB: Asian Development Bank; ADRA: Adventist Development and Relief Agency; AEPC: Alternative Energy Promotion Centre; AF: Adaptation Fund; AFU: Agriculture and Forestry University; ANSAB: Asia Network for Sustainable Agriculture and Bioresources; AusAID: Australian Agency for International Development; BCN: Bird Conservation Nepal; BMUB: Federal Ministry of the Environment, Nature Conservation and Nuclear Safety; BMZ: Federal Ministry of Economic Cooperation and Development; CARE: Cooperative for Assistance and Relief Everywhere; CDKN: Climate and Development Knowledge Network; CARIAS: Collaborative Adaptation Research Initiative in Africa and Asia; CCAFS: Climate Change, Agriculture and Food Security; CFUGs: Community Forests User Groups; CGED: Center for Green Energy Development, Nepal; CGIAR: Consultative Group on International Agriculture Research; CYMMIT: International Maize and Wheat Improvement Center; DADO: District Agriculture Development Office; DANIDA: Danish International Development Agency; DFID: Department for International Development; DFO: District Forest Office; DHM: Department of Hydrology and Meteorology; DLSCO: District Livestock Service Organization; DNPWC: Department of National Parks and Wildlife Conservation; DOA: Department of Agriculture; DOF: Department of Forest; DSCWM: Department of Soil Conservation and Watershed Management; ECARDS: Environment, Culture, Agriculture, Research and Development Society Nepal; ECCA: Environment Camps for Conservation Awareness; ENPHO: Environment and Public Health Organization; ENPRED: Environmental Preservation for Development; EU: European Union; FAO: Food and Agriculture Organization; FECOFUN: Federation of Community Forestry Users Nepal; FINNIDA: Finnish International Development Agency; FORWARD: Forum for Rural Welfare and Agricultural Development; GCCA: Global Climate Change Alliance; GCF: Green Climate Fund; GEF: Global Environment Facility; GIZ: German Agency for International Cooperation; HELVETAS; iDE: Integrated Development Environment; HUC: Himalayan University Consortium; ICIMOD: International Centre for Integrated Mountain Development; IDRC: International Development Research Centre; IDS Nepal: Integrated Development Society Nepal; IFAD: International Fund for Agriculture Development; IKI: International Climate Initiative; IMF: International Monetary Fund; ISET Nepal: Institute for Social and Environmental Transition-Nepal; IUCN: International Union for Conservation of Nature and Natural Resource; IWMI: International Water Management Institute; JICA: Japan International Cooperation Agency; KIB: Kunming Institute of Botany; LDCF: Least Developed Countries Fund; KIRDARC: Karnali Integrated Rural Development and Research Centre; KMC: Kathmandu Metropolitan City; KVDA: Kathmandu Valley Development Authority; LACCOS: Langtang Area Conservation Concern Society; LIBIRD: local Initiatives for Biodiversity, Research and Development; LWF: Lutheran World Relief; LWF: Lutheran World Federation; MDO: Machhapuchhre Development Organization; MOAD: Ministry of Agriculture Development; MOALD: Ministry of Agriculture and Livestock Development; MOFAGA: Ministry of Federal Affairs and General Administration; MOFE: Ministry of Forests and Environment; MOSTE: Ministry of Science, Technology and Environment; NARC: Nepal Agriculture Research Centre; NAST: National Academy of Science and Technology; NCI Nepal: Nature Conservation Initiative Nepal; NCST: Nepal Climate Vulnerability Study Team; NDRI: Nepal Development Research Institute; NEC: Nepal Engineering College; NEFEJ: Nepal Forum for Environment Journalist; NEWAH: Nepal Water for Health; NHRC: Nepal Health Research Council; NORAD: Norwegian Agency for Development and Cooperation; NPC: National Planning Commission; NTAG: Nepali Technical Assistance Group; PRC: Prakriti Resources Centre; NTNC: National Trust for Nature Conservation; NYCA: Nepalese Youth for Climate Action; ODI: Overseas Development Institute; OECD: Organization for Economic Cooperation and Development; OXFAM: Oxford Committee for Famine Relief; PLAN Nepal; RECOFTC: Regional Community Forestry Training Center (Asia & Pacific); RIMS: Resource Identification and Management Society Nepal; RRN: Rural Reconstruction Nepal; SANDEE: South Asian Network for Development and Environmental Economics; SAPPROS: Support Activities for Poor Producers in Nepal; SAWTEE: South Asia Watch on Trade, Economics & Environment; SDC: Swiss Agency for Development and Cooperation; SEN: The Small Earth Nepal; SIDA: Swedish International Development Cooperation Agency; SNV: Netherlands Development Organization; TEWA; TMI: The Mountain Institute; TU: Tribhuvan University; UNDP: United Nations Development Program; UNEP: United Nations Environment Program; UN-Habitat: United Nations Habitat Programme; USAID: United States Agency for International Development; WB (IDA): The World Bank (International Development Association); WCN: Wildlife Conservation Nepal; WFP: World Food Programme; WHO: World Health Program; WRI: The World Resources Institute; WUAs: Water Users' Association; WWF: World Wide Fund; YAE: Youth Alliance for Environment

Despite the large number of institutions involved in CCA in Nepal, there is mere engagement of private sectors in CCA adaptation (Sud et al., 2015). This scenario revealed that the current enabling environment in attracting private sectors to CCA projects is feeble. The private sector engagement in real sector companies and in hydropower is important from climate perspectives (Bhattarai, 2017). The concept of smart city, agriculture and forestry could be one of the best entry points for low-carbon climate-resilient interventions in Nepal, where the private sector can make significant investments. It is well acknowledged that effective adaptation interventions require harnessing synergies among various government schemes (Mirza, 2011) along with the active involvement of all stakeholders in the monitoring and evaluation, and implementation and benefit sharing (Lebel et al., 2010).

3.3.4.6 Development partners, their supported projects and implementation mechanism

Of the 73 projects listed by donors between 1997 and 2010 worth of 650 US\$ ml (WB website, Bird, 2011), the largest number has been on capacity strengthening and awareness raising activities. The dominant external actor, in terms of both the number of initiatives supported and the amount of funding pledged was the World Bank (Bird, 2011). The similar number of project heads (73) was reported in the present assessment and the DFID, USAID, UNDP-GEF, FAO, ADB, WB, CCAFS/CGIAR and BMZ/BMUB, Germany were found as major development partners (Table 13).

Table 13. Development partners and their number of approved projects in Nepal between 2010 and 2019

Dev. partners	Number of project supported	Dev. partners	Number of project supported
DFID	19	DANIDA	2
UNDP, GEF	17	NORAD	2
USAID	7	WFP	1
FAO	7	IFC	1
ADB	5	SIDA	1
BMUB/BMZ Germany	7	PLAN	1
WB	5	WWF	1
CCAFS/CGIAR	5	Oxfam	1
CDKN	5	JICA	1
EU	3	WHO	1
CARE	3	SDC	1
IDRC	3	Finnida	1
UNEP	2	Australia	1
		IFAD	1

From the range of climate resilience interventions that are eligible for support, DFID selected adaptation measures at the local level because vulnerability to climate change can manifest itself in many ways (<https://pubs.iied.org/pdfs/10058IIED.pdf>). LAPA piloting (Climate Adaptation Design and Piloting (CADP)) was carried out in nine districts with DFID funding and implementation support from LiBIRD, RIMS Nepal, Rupantaran and ISET-Nepal. Starting in 2011, DFID formally worked on the implementation of LAPA in 14 districts as a major development partner, NCCSP as a project and MoPE and MoFAGA as implementing body at a central level, and LiBIRD and Rupantaran as local partners. Given the need for immediate actions at the local level, the Nepal Climate Change Support Programme (NCCSP, funded by the DFID-UNDP) has continued its work to address the

most urgent and immediate needs of communities in 26 local governments of 14 districts of Nepal.

IKI, the funding programme of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) supports the implementation of specific measures in partner countries within the context of the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD). It funds high-quality projects that are sufficiently innovative or have sufficiently ambitious climate protection and biodiversity conservation goals to promote transformative change. IKI and GEF are key donors to EbA initiatives.

The Green Climate Fund was established in 2010 and operationalized in 2011 to support the climate change mitigation and adaptation projects, programmes, policies and other activities in developing country Parties. GCF finances projects and programmes that demonstrate the maximum potential for a paradigm shift towards low-carbon and climate-resilient sustainable development. GCF does not implement projects directly, but through partnerships with accredited entities. In Nepal, AEPC and NTNC are GCF accredited NIEs, former dedicated to low-carbon and the later to climate-resilient measures. There are three projects approved by the GCF, all of which are dedicated to capacity development and the integration of climate change into development planning. Climate change adaptation through promotion of agriculture productivity and food security, and application of climate-smart measures is a basic of FAO project implementation. Empowerment of women and marginalized communities is sought while implementing projects. A crucial part of the CDKN's strategy is the exchange of views on which approaches are (and are not) working in terms of climate compatible development. Research and knowledge management are basic principle of CDKN funding.

3.3.4.7 Climate financing

UNFCCC refers climate finance as “local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change” (UNFCCC, 2020). Climate finance in Nepal was officially started as soon as the developed countries committed to providing US\$ 100 Billion a year to developing countries by 2020 (COP9 and COP14). This was later reaffirmed in the Paris Agreement in 2015 (COP21). Thus, climate finance is at an early, formative stage in Nepal, this assessment offers a forward-looking perspective on how climate finance is administered.

Between 2009 and 2012, Nepal received a total commitment of approximately US\$ 236 ml (Oxfam Nepal, 2014), and between 2011 and 2016, a total of US\$ 151.04 ml was pledged as international assistance by several developed countries for climate actions. Out of the pledged amount, US\$ 49.17 ml (33%) was for mitigation, and US\$ 101.87 ml (67%) for adaptation actions. The financing was made from the CIFs through the SREP, PPCR, LDCF, and other multilateral agencies. Bilateral funds were from the United Kingdom and European Union, primarily through the NCCSP, USA, Switzerland, Germany, Finland, etc. It has been estimated that approximately US\$ 652 ml of international public grant finance for climate change-related activities has been made available until 2014 (MoALD, 2019). The dominant external actor, in terms of both the number of initiatives supported and the

amount of finance committed, is the WB followed by ADB (<http://www.prc.org.np/uploads/resources/U4Fa-N2ChfRZLERGVbMuRIEg1odKEIo-.pdf>).

Table 14. Multilateral climate change funds (US \$) to Nepal

Fund	Project	Development partner	Executing agencies	Approved	Disbursed
PPCR	Building Climate Resilience of Watersheds in Mountain Eco-Regions (BCRWME)	ADB (2013-2020)	DSCWM and MOSTE	PPCR 24.4 Nordic 4.6	11.69
	Building Climate Resilient Communities through Private Sector Participation (BCRC-PSP)	WB-IFC (2015-2020)	NA	PPCR 28.8 Others 19.8	8.7
	Building Resilience to Climate Related Hazards (BRCH)	WB (2013-2018)	DHM and MOAD	PPCR 31 Others 0.3	17.87
	Mainstreaming Climate Change Risk Management in Development (MCCRMD)	ADB (2011-2017)	MOSTE	PPCR 7.2 Others 0.6	5.14
LDCF	Reducing Vulnerability and Increasing Adaptive Capacity to Respond to Impacts of Climate Change and Variability for Sustainable Livelihoods in Agriculture Sector in Nepal	GEF (2015-2019)	FAO, MOAD	2.689	2.689
	National Adaptation Programme of Action to Climate Change	UNDP-GEF (2010)	MOSTE	0.2	0.2
	Ecosystem-Based Adaptation for Climate-resilient Development in the Kathmandu Valley, Nepal	UNEP, ADB, GEF, JICA (2019-...)	KVDA	6.24	
	Developing Climate Resilient Livelihoods in the Vulnerable Watershed in Nepal	UNDP (2020-2024)	MOFSC	7.0	
	Community Based Flood and Glacial Lake Outburst Risk Reduction	UNDP-ICIMOD (2013-2017)	MOSTE DHM	6.30	6.30
	Catalyzing Ecosystem Restoration for Resilient Natural Capital and Rural Livelihoods in Degraded Forests and Rangelands of Nepal	UNEP-GEF (2019 -)	MOFSC, MOAD, MOPE	5.75	
GCCA	Building Climate Resilience in Nepal	DFID, EU (2013-2015)	MOSTE, MOFALD	9.64	0.67
AF	Adapting to climate induced threats to food production and food security in the Karnali Region of Nepal	WFP (2018-2022)	MOFE, MOFALD	9.527	2.34
Adaptation for Smallholder Agriculture Programme	Adaptation for Smallholders in the Hilly Areas (ASHA)	IFAD (2014-2020)	MOFE, MOALD, MOFAGA	15	1.5
TOTAL				179.04	57.09

(Source: <https://climatefundsupdates.org/data-dashboard/#1541245745457-d3cda887-f010>; <https://www.adb.org/sites/default/files/publication/377761/mainstreaming-climate-risk-management.pdf>).

3.3.4.8 National budgeting for CCA

Between 2009 and 2014, US \$ 538.24 million was invested in adaptation activities, of which 44.4% was allocated to forest and biodiversity, 16.4% to disaster risk reduction, 3.2% to capacity building activities, 9.1% to agriculture and food, 0.01% to urban settlements, and 26.9% to other sectors (Oxfam Nepal, 2014). More than half of Nepal's climate finance comes from bilateral and multilateral funding (Dixit et al., 2016). Along with foreign aid (grant (~90%) and loan (~10%) (Oxfam Nepal, 2014)), the matching fund and local budget allotted by the GoN is also important for the integration of CCA into development plans. A review in 2011 by CPEIR found that there were a total of 83 budget heads with ~ 6% of the national budget related to climate before 2010 (Table 14). There was a significant increase in the climate budget in Nepal after 2013, rising to 14% in 2014 (Bhandari 2017), 20% in 2016 (Bishokarma, 2017), mainly due to PPCR/SPCR prioritized MCCRM and DFID funded CPGD projects. Over the years, there has been a significant increase in the allocation of the budget under the CCA, and almost 2^{1/2} times increment in the budget over the last five years (NDRI and PRC, 2017). Now, more than 1/3rd budget is related to climate change and 2/3rd of that is dedicated for CCA (Table 15). However, the budget allocation did not come without criticism (Bishokarma, 2017). A study revealed that only about 52% of climate relevant budget reached at the field local levels (Bhandari, 2017).

Table 15. Percentage of climate change related budget in comparison to total budget of Nepal

Year	Total budget (NRs, BI)	Climate budget (NRs, BI)	Highly relevant CC budget	% of climate budget	Remarks
2011/12 (2068/69)	384.9	34.7		7.2	(67-78% budget for adaptation)
2012/13 (2069/70)	424.8	27.2	18 (4.45%)	6.7	
2013/14 (2070/71)	517.24	53.48	27.75 (5.36%)	10.34	
2014/15 (2071/72)	618.10	66.34	34.98 (5.66%)	10.73	
2015/16 (2072/73)	819.46	159.3	61.85 (5.9%)	19.45	
2016/17 (2073/74)	1048.92	201.6	57.73 (4.52%)	19.22	
2017/18 (2074/75)	1278.99	393.4		30.76	
2018/19 (2075/76)	1315.16	487.00		37.03	

Source: CPEIR, 2011, NPC, 2013; MOALD, 2019, <http://www.prc.org.np/uploads/resources/U4Fa-N2ChfRZLGRVbMuRIEg1odKEIo-.pdf>; https://mof.gov.np/en/document/index.php?c=28&page_no=1; <https://www.climatefinance-developmenteffectiveness.org/sites/default/files/bookletNepalEng.pdf>

Although the data (Table 15) was stated credible (CPEIR, 2011), it was under-reported as there were a number of climate-related projects carried out at the local and province ministries and NGOs. LAPA actions were incorporated and budgeted in the local level annual planning (MOPE/GoN, 2016). Therefore, actual climate activities could be much larger than what is reflected in regular government programs and climate funds. While climate budget expenditure were reported as underutilized (<https://www.downtoearth.org.in/news/climate-change/more-than-half-of-nepal-s-climate-budget-remains-underutilised-report-66487>), only about 53% of the climate budget was found used (<http://www.indiaenvironmentportal.org.in/files/file/Nepal-Citizen-Budget-English.pdf>). Therefore, current climate financing is constrained (MoALD, 2019), and an approach to facilitate the integration of climate change strategies into development planning must be adopted. It is also important to work closely with the Ministry of Finance and the NPC to ensure alignment with broader planning and budgeting processes (Parry et al., 2017).

3.3.4.9 CCA outputs

CCA helps individuals, communities, organizations and natural systems to deal with the unavoidable impacts of climate change. It involves taking practical actions to manage risks from climate impacts, protect communities and strengthen the resilience of the economy. Key lessons or guidelines from CCA projects could help the NAP process in shaping the future CCA investment strategy (Table 16).

Table 16. Key guide/lessons from the CCA projects

Sector	Guides/Lessons	Project and number (number corresponds to the factsheet, see annex 4)
Agriculture and Food Security	Climate smart agriculture such off-seasonal farming, organic farming, Good agricultural practices	34. NAP-Ag
	Vulnerability risk assessment	34. NAP-Ag
	Indigenous crop varieties are resistant to climate change	22. CCCR
Forestry and Watershed Management	Forest restoration	30. Hariyo Ban
	Biodiversity increased	30. Hariyo Ban
	Bio-engineering, Eco-safe roads	27. Ecosystems Protecting Infrastructure and Communities (EPIC)
Water & Energy	Rainwater harvesting, Solar-based power	28. Enhancing Capacities for Climate Change Adaptation.....
	Holistic river basin strategy	30. Hariyo Ban
	Integrated irrigation and drinking water project	38. NCCSP- T
	Low cost ponds and water efficient technologies	35. ICCA project
	Solar based irrigation system	16. CSV II
	Ground water conservation	29. Groundwater Resilience
Industry & Transport		
Urban and Rural habitats	Community pond, improved shed	17. CSV
Research and Technology	Mobile technology, programming	45. Scaling up CSA
	Long term research is needed	23. EbA 1
	low-cost local technologies and best practices	11. Building Resilience to landslides and the establishment of early warning systems in Nepal
	Interdisciplinary researches on CCA	32. Hi-AWARE
Capacity development and awareness raising	Integration of climate agendas in Development planning, use of apps	18. Climate proofing
	New generation, citizen scientists	10. Building Resilience to Landslides.... 20. CBM for Resilience Project
	Peer-to-peer learning	15. 4CA
	Better ways of communicating through different media	12. Building CCA awareness
	Incorporate scientific knowledge in LAPA	33. HiMAP
	Bottom up approach planning	19. CCA in CHAL
	Increase smooth flows of climate information	9. Building Effective Water Governance

GESI	Prioritized for marginalized communities	42. Reducing vulnerability and increasing adaptive capacity
	Women empowerment	http://www.fao.org/nepal/news/detail/en/c/1116472/
	LAPA implemented	NCCSP 1: https://www.np.undp.org/content/nepal/en/home/projects/nccsp.html
	CFUGs, Leasehold groups are instrumental in CCA	24. EbA scaling up
	CAPA plans seem more realistic and chances are high to be implemented.	36. MSFP
	Government and policy support	43. Himalica
Climate Finance	Transparent and robust record keeping	32. Hi-AWARE
	Developing capacities for climate finance reforms	18. Climate proofing
	Local financing for local support, Seed money approach	46. Strengthening CSOs and Community Response to Climate Change in Nepal (SCRC)
WASH	Water safety plans	13. WASH
	Improve cattle shed/farm yard manure	17. CSV I
Disaster	Community based risk reduction	21. Community Based Flood and Glacial Lake Outburst
	Early warning of weather	14. BRCH, 11. BRL
	Coordinated preparedness and land use planning	21. Community Based Flood and Glacial Lake Outburst

3.3.4.10 Beneficiaries through CCA interventions

Climate change impacts are disproportionately felt by those that are the least able to adapt their access to resources or to migrate. Most projects are in place with a focus on the most poor, and in remote mid and Far Western regions of Nepal.

Based on the availability of project information (project outputs, success story, lesson learned, challenges, way forward), 50 CCA projects have been sorted out. Of the 50 projects that have been sorted out for further analyses and factsheet development, almost one in three projects contain clear documentation about the beneficiaries. Likewise, of the eight different types of beneficiaries that we have proposed in Table 17, the major beneficiaries came from awareness raising and capacity building activities, as most projects have invested in capacity development and awareness raising. Table 17 provides types of adaptation measures and their beneficiaries of the selected 18 projects.

Table 17. CCA beneficiaries

Project	Awareness/ capacity building	Efficient water use/drinking water	Water source protection	Climate resilient agriculture	Irrigation technology /systems	Access to electricity	Plantation/ restoration	DRR/Early warning
ASHA	93,695	15,186	0	50,602	4046	4046	0	0
Anukulan X	0		0	91,205	305	0	0	1802
ANUKULAN	325000	19619	0	102210	4971	0	0	0
Samarthya	0	0	0	399	0	0	0	0
NCCSP-T	19191	1487	505	0	5961	800	0	0
NCCSP I	139772	25000		20000	12000	10000	0	0

MSFP	239617	10000	13500	13200	4000	3000	43001	0
ICCA	19,625	3000	0	2025				0
Hariyo Ban I	89847	4000	0	7000	3025	7000	6892	0
EbA I	509	0	2092	0	0	0	2496	0
CSV I	0	0	0	600	0	0	0	0
BRL	0	0	0	0	0	0	0	774
BRCRN	200681	0	0	0	3954	0	0	
BCRWME	21006	0	0	0	51,278	0	0	
Anukulan	340136	4458	0	102000	21458	0	0	
Total (18)	1,489,079	70833	2092	354096	102482	20732	2496	2576

3.3.4.11 Climate Justice

There is overwhelming evidence that human activities are changing the earth's climate system. The climate change is leading to unprecedented changes in the natural environment, which in turn is affecting the way we live with potentially dramatic consequences on our health, energy sources and food production. The impacts and consequences of the climate change are not felt equitably among the people and are not borne equally or fairly, between rich and poor, women and men, and older and younger generations. From extreme weather to glacier melting, the impacts of climate change often have disproportionate effects on the historically marginalized or undeserved communities, who already live under precarious conditions. Climate change, with its many facets, further exacerbates existing inequalities faced by these vulnerable groups. Consequently, there has been a growing focus on climate justice, which looks at the climate crisis through a right-based lens and believes that by working together we can create a better future for our present and future generations.

Climate change is unjust in part, because it undermines the enjoyment of individual's human rights since changing climate can have differing social, economic, public health, and other adverse impacts on people and societies. Climate justice insists on a shift from a discourse on GHG and melting ice caps into a civil rights movement with the people and communities most vulnerable to climate impacts at its heart. Advocates for climate justice strive to have the inequities addressed head-on through long-term mitigation and adaptation strategies. Therefore, while planning CCA interventions, we have to make sure that these people and communities adequately and equitably receive the CCA benefits. For this to happen, we should seek to implement adaptation policies that acknowledge the climate justice, coupled with cultural rights of indigenous people and promotion of GESI.

3.3.5 Conclusions and Recommendations

3.3.5.1 Conclusions

There are climate change policies and climate budget code to prioritize and track climate change-related fund to make the ecosystems and human systems resilient and adaptive to climate change. As a result, there are a number of supports from bilateral and multi-lateral agencies that enables the government to work effectively on climate change adaptation. The government budget in climate change actions was matched up, and about 6% of the total annual budget of the country was allocated for climate change before 2010, while after the NAPA, it has been increased up to about 25% of total annual budget, resulting in a wide range of climate change adaptation interventions.

As a whole, the CCA interventions are categorized into community-based practices to government-led programmes to development partners' -funded projects. The projects are further categorized into five types, CbA, CSA, CRDP, EbA, and RKM for early warnings and quality data. This report could present a total of 73 project heads started from 2005, in spite of the fact that the scope of this assignment was to draw practice from 2010. Capacity building and awareness raising were the major thrust of the most of the projects while the projects addressing the vulnerabilities and risks associated with climate change through research and technology adoption were quite low. The current need of investment on research and quality data generation is quite imperative. Project for vulnerabilities related to human health (WASH) and settlements were underemphasized, coupled with less number of projects on climate finance, private sector involvement and forestry and watershed management. Tourism and Culture sector needs an urgent attention since neither it had projects in the past, nor any projects are planned for climate adaptation though the promotion of the tourism and culture. Building resilient human settlements entails a complex integration and holistic management of available indigenous, traditional, and local knowledge in managing local resources judiciously and drawing lessons from the experiences, observations and peer learning.

Out of the 77 districts, there are 6 districts, i.e., Parsa, Taplejung, Gulmi, Palpa, Panchthar, and Rautahat that received no CCA investment so far, in spite of the fact that the former two are highly vulnerable. In contrast, Bardiya is the only district, which has the highest number of projects (14), despite its low climatic vulnerability. These discrepancies need to be resolved while advancing the NAP implementation in Nepal. There are over 100 institutions working on reducing climatic vulnerabilities and risks, and improving adaptive capacities. Despite the large number of institutions involved in CCA in Nepal, there is a mere engagement of private sectors in climate change adaptation. This revealed that the current policy environment in attracting private sectors to CCA should be enabled and strengthened further. The CbA is more frequent as higher investment is in place on communities and their socio-economic systems, followed by the integration of climate change agendas in development plans. Since the Climate Change Financing Framework (CCFF) (2017) and the National Climate Change Policy (2019) further emphasized the integration of CCA interventions in development planning, the projects enabling institutions and policy instruments, and sustaining climate financing are facilitative to the NAP implementation.

3.3.5.2 Recommendations

As Nepal is physiographically, socio-culturally and climatically heterogeneous, localized and contextual CCA measures are highly recommended. Efforts to respond to climate change should build on local perceptions of climate risks and existing indigenous strategies. EbA, acknowledging people at its centre, and using participatory and culturally appropriate ways to address climate risk and vulnerabilities through ecological and natural solutions could be a suite in advancing the CCA in Nepal.

At the local government, local institutions and communities are considered as a major stake of climate change impacts. It is to be important to secure the appropriate institutions and structures as an implementing unit with appropriate policy tools and instruments for ensuring the flow of climate finance/benefits reaching out to the most vulnerable entities. At the present condition, this requires better integration of climate in development planning and demands augments in the capacity of local stakeholders. Mapping of local institutions dedicated to climate change management; capacities and relationships would be a good starting point to identify potential local actors that could well collaborate in managing the finance and develop climate change programmes at the local level. The strengths of Nepal's approach to CCA planning and implementation reflected through community-led processes, notably through its LAPAs, CbAs and CSAs. Replications and up-scaling these lessons in EbA piloted project is in place. However, integrating these lessons into national level development plans is yet to be institutionalized.

Mainstreaming is necessary to integrate CCA options into different levels of government plans, policies and programmes and to guide projects to consolidate the inputs and actions in order to address the climate risks and vulnerability, and aid the adaptive capacity and resilience. Strengthening multi-level institutional partnerships, including collaboration with farmers and CSO, CBOS and NGOs at critical stages of technological development and transfer is crucial for advancing climate risk management, adaptation and resilience building and technology adoption for combatting climate impacts.

The paradigm shift is needed to transfer the current reactive mode to a more pro-active mode or from disaster management (post disaster) to disaster preparedness (or disaster risk reduction). In order to pursue proactive measures, research and adoption of technology is highly pressing. The respective investment on those sectors is immediate. In the context, data and information about climate change impacts and vulnerabilities must be systematically acquired, assessed and analysed to help develop a resilient future adaptation strategy that aids the NAP implementation.

3.4 OUTPUT 2: ASSESSMENT OF EFFECTIVENESS OF CLIMATE CHANGE ADAPTATION INTERVENTIONS

3.4.1 Executive summary

This study aims to contribute to the advancement of Nepal NAP process through a review of past and current climate change adaptation interventions and development of options, enablers and indicators for qualifying and evaluating climate change adaptation interventions. We adopted both review and participatory approaches while collecting, collating and reviewing data and information regarding the CCA interventions in Nepal. A total of 73 CCA projects catalogued in O1 were evaluated and their best practices were sorted out. Following indicators proposed by the GIZ/IISD, GCF and other independent contributors, a merit list of options were proposed for a CCA project success, and indicators were proposed for evaluating CCA project performances. Both the Multi-Criteria Analysis (MCA) and Qualitative Content Analysis (QCA), along with international standards, published literature and interview with CCA proponents, experts and project personnel were employed to refine CCA type-specific indicators for assessing the effectiveness of adaptation interventions. Based on these mutually agreed conditions, CCA evaluation effectiveness indicators were proposed.

Nepal's population has surpassed 29 million people (CBS, 2018), of which almost 80% depend on agriculture-based livelihoods. About 80% population still live in rural remote areas for their livelihood, and 80% of them are exposed to the risk of natural hazards, such as earthquakes, droughts, floods, landslides, extreme temperature, and glacier lake outburst floods (GLOFs) (MoHA, 2017). In this regard, the community-based adaptation (CbA) projects, such as food availability, access to loans, credits, training, free-health, insurance, income generating activities, micro-enterprises, etc. caring over local livelihood are in the priority (Jennings and McGrath, 2009). USAID (ICCA project 2012-2017), provided support for local adaptation planning to develop sustainable livelihood opportunities for over 20,000 smallholder families through the sustainable use and management of NTFPs, high-value crops, coffee, and essential oils (USAID, 2013).

Like CbA, ecosystem based adaptation (EbA) has people at its centre, which uses participatory, culturally appropriate ways to address challenges, at the same time, there is a stronger emphasis on ecological and natural solutions, thus, is heralded as 'bottom-up' approaches to adaptation. In Nepal, where household and national economies largely depend on natural resources and their biophysical services, EbA could be a strategic entry point in reducing climatic risks and vulnerabilities and for improving economies. IKI, the funding programme of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and GEF are the key donors of EbA initiatives. Whereas, the FAO and CCAFS, work to integrate pro-poor adaptation through working to support agriculture by increasing food security, diversifying livelihoods, and applying climate-smart technologies and practices and mitigation regimes, are major partners in the Climate Smart Agriculture (CSA) interventions in Nepal. FAO/UNDP implemented NAP-Ag project that piloted the VRA framework at the national and local level (2016-2018) and DFID/OPM/PIF supported the VRA to assist Nepal NAP process. Of the range of climate resilience interventions eligible for support, DFID opted local-level

adaptation measures because of the multiple ways vulnerability to climate change can manifest.

In 2010, a project jointly funded by the GEF-LDCF, UNDP, DFID and the Embassy of Denmark helped prepare NAPA Nepal and set up NCCKMC and MCCICC. National Climate Change and Knowledge Management Centre (NCCKMC) is to serve as a dedicated institutional arrangement for managing climate change knowledge in Nepal, through providing a platform for coordinating and facilitating the regular generation, management, exchange, and dissemination of climate-related knowledge. Early warning, generating new data and information, awareness raising, capacity building, and managing the knowledge, etc. are efficient tools of the Research and Knowledge Management (RKM) in managing CCA knowledge.

Multi-stakeholder Climate Change Initiatives Coordination Committee (MCCICC) was formed in 2010 under the MoE to serve as the key national platform for ensuring regular dialogue and consultation on climate change related policies, plans, finances, programmes, projects and activities and mainstreaming CCA in development plans. A key way to mainstream CCA in planning and foster climate-resilient development planning (CRDP) through the integration of CCAs in plans, policies and strategies help achieve sustainable development. The NAP process assists in mainstreaming CCA into development policies, plans and strategies. There are three projects in Nepal funded by the Green Climate Fund (GCF), and all these projects are subjected to enabling the policy environment in order to strengthen the mainstreaming of CCAs into development planning at each government levels. The emerging climate scenario also demands that development plans and programs to be made resilient enough that they can adapt to the changing situation and context. As large number of development partners and global communities with their diverse CCA projects are engaged in the NAP formulation and implementation at different stages, knowledge sharing, peer-to-peer learning and replication of lessons learned; long-term collaboration among the agencies can help make the NAP process more efficient, effective, sustainable and innovative (MOFE, 2018) which are also proposed as potential outcome indicators in this study.

A set of indicators comprising the institutional and behavioural responses, the use of technologies, and the design of climate-resilient plans and climate-smart practices, which balances economic, social, and environmental sustainability, following the McCarthy et al., (2012); Hammill et al., (2014); GCF (2020) and Donatti et al., (2020) was proposed for assessment of CCA interventions. There is a need to test the feasibility of the indicators proposed here and to promote their uses so a robust understanding of the role of CCA and its particular type in providing adaptation benefits could be ensured.

3.4.2 Background

Because of its extreme variations in altitude and precipitation, the relatively small territory of Nepal exhibits remarkably diverse climatic conditions, ranging from the sub-tropical to the alpine. The vagaries of climate change increase the vulnerability of the population, whose primary occupation is agriculture. Because of the regular and frequent occurrence of different natural hazards and the vulnerability of the population, Nepal is a disaster hotspot. The country's social context—is its low level of development and institutional functions— that further foments the disaster impacts. Climate change is decimating remote rural areas and marginalized communities in the hardest way possible.

The total CCA project heads (73) were reported in O1 and the DFID (19), UNDP-GEF (17), USAID (7), FAO (7), Germany (BMUB, BMZ) (7), ADB (5), WB (5) and CCAFS/CGIAR (5) were major development partners for these projects. Including these, there were about 100 institutions working on reducing climatic vulnerabilities and risks, and improving the adaptive capacities of marginalized communities living in remote rural areas of Nepal. Despite the large number of institutions involved in CCA interventions in Nepal, there was a mere engagement of private sectors in climate change adaptation. This revealed that the current policy environment in attracting private sectors to CCA should be enabled and strengthened. Along with this premise, a review of outcomes laid by CCA interventions through a set of criteria and indicators is requisite in order to streamline the NAP advancement.

3.4.3 Scope of this study

In this report, the Output 2 of the Assignment “ An assessment of the effectiveness of past and current climate change adaptation programmes and measures, in particular ecosystem-based adaptation approaches, for medium to long-term planning context” was tried to comprehend through:

1. Developing criteria for determining adaptation effectiveness in the medium and long- term planning context; and
2. Undertaking a desk-based assessment, based on the review of documents and interviews with key proponents of adaptation programmes and measures contained in Output 1 (Compilation of adaptation programmes and measures).

Furthermore, the assessment pursued for

- (i) Identifying the best practices of adaptation interventions in the 12 thematic areas in the medium to long- term planning context; and
- (ii) Recommending climate change adaptation programmes and measures, in particular, ecosystem-based adaptation approaches as options for addressing climate risks and vulnerabilities; and
- (iii) Finalizing report based on stakeholder's workshop contributions and comments from the NAP PMU/CCMD/UNEP.

3.4.4 Climate Change Impacts in Nepal

Because of its extreme variations in altitude and precipitation, the relatively small territory of Nepal exhibits remarkably diverse climatic conditions, ranging from the sub-tropical to the alpine. During the monsoon, rainfall is often sharp and intense, but its magnitude, duration and intensity vary dramatically at the macro, meso and micro-scales. The vagaries of climate change increase the vulnerability of the population whose primary occupation is agriculture (Dixit, 2010). Difference in altitude can cause large variations on biodiversity, culture and bio-climate. Increase in the daily variability of temperature can result in lower crop yields (Rai et al., 2011; Lal, 2011; Wheeler et al., 2000) and an increase in daily average temperature can enhance pests and weed attacks, further increasing the risk of diseases (Dukes and Mooney, 2000; Patz et al., 2000; Ziska et al., 2011).

Because of the erratic occurrences of different natural hazards and the vulnerability of the population, Nepal is a disaster hotspot. The country's social context—is its low level of development and institutional capacities—which also intensifies the impacts of disasters. Nepal ranks 4th in terms of climate risk, according to the Global Climate Risk Index, which assesses the impacts of meteorological events in relation to economic losses and human fatalities (Eckstein et al., 2019). Also, the country ranks 11th in terms of global risk for earthquake occurrence and impact (MoHA, 2015). The country is in top 20 of all the multi-hazard countries in the world.

3.4.5 Climate Change Adaptation Types in Nepal

The First National Communication (NATCOM-1) report to the UNFCCC (2004) provided an overview of national circumstances that reflects Nepal's capacity to respond to the climate change impacts. National Capacity Self-Assessment (2008) clearly identified that the lack of institutional capacity for climate change risk management and that poor coordination amongst the agencies concerned are the main reasons why climate change risks management is not formally integrated into development planning in Nepal (Saito, 2012). To identify and address the CCA needs, the government of Nepal prepared the NAPA in September 2010 with adherence to the decision 29, COP7 (2001) and guidance of the LEG. Then after, the GoN has considerably undertaken climate change and its impact as a key risk to the country's socio-economy and ecosystems and has developed a series of climate risk management strategies at national and local levels (MoSTE, 2014). NATCOM-1 emphasizes studies and assessments of measures on adequate adaptation to Climate Change. Similarly, NATCOM-2 (2014) emphasizes sector specific adaptation measures (MoSTE, 2014). Moreover, a report for NATCOM-3 (2017) updates the greenhouse gas emission (0.06%) from Nepal and projects that the GHG emission can be expected to be increased in the coming days (GoN, 2017). With adherences to the NAPA and prioritized sectors of the NAP process and NCCP 2019, the CCA Interventions in Nepal ranged from supporting community-based adaptation (CbA) to enabling climate-resilient development planning (CRDP). Other interventions augmenting adaptive capacities made possible are climate-smart agriculture (CSA), nature/ecosystem-based adaptation (EbA) and research, generating data and equipping early warning system and knowledge management (RKM). It is not possible to be a CCA intervention exclusively of one particular type of theme/sector focused. They are inter-connected. Most of the CbAs are themed on the DRR and GESI

(livelihood, governance), whereas the CSA are meant for agriculture and food security, adoption of new technologies, and new scientific knowledge. EbA in particular acknowledges local knowledge, appreciates multi-stakeholders, incorporates hard infrastructure-based approaches and works for the Forest & Watershed Management, GESI and DRR. Some projects meant for mainstreaming climate risks and vulnerability actions in development plans are grouped as CRDP, whereas the projects for generating data, early warning systems, preparedness practices fall under the RKM. The common CCA type is community-based adaptation (Table 18).

Table 18. Number of CCA projects and their interventions along CCA types

	CbA	CRDP	CSA	EbA	RKM
CbA	46 (UTHAN)	18	22	10	18
CRDP	18 (WASH, KSLDP, HiMAP)	31 (NAPA, BRCH-DHM)	11	3	7
CSA	22 (SAMARTHYA, CRA)	11 (NAP-Ag)	25 (CSA-Ag), RTF)	2	8
EbA	10 (EbA, Hariyo Ban)	3 (Hariyo ban, EbA-Kathmandu)	2 (Himalica, BCRWME)	12 (EPIC)	5
RKM	18 (ICCA, LINEX-CCA; SHL-WWF)	7 (GCF-Nap, Readiness, CPGD)	8 (BRCRN, CSV,	5 (EbA, CHAL, HiMALICA, Hariyo Ban)	33 (HiAWARE, NCKMC, CLACC, SA water
CSA	10 (ASHA, ANUKULAN, Food security-WFP, Building effective water governance (IDRC), NCCSP)				
EbA	3 (MSFP, Hariyo Ban)				
RKM	3 (CCCR, Hariyo Ban I, II)		CbA-CSA-RKM: 7 (CBM for Resilience Project (FAO); Building Resilience to Landslide along Seti, CSV I, II)		
CbA		5 (WWF-CHAL, EbA, Hariyo Ban, HiMALICA)			
CbA			2 (Himalica, BCRWME)		
CbA-CSA-CRDP-RKM: 1 (BRCRN: GCF-FAO)			CbA-CSA-EbA-RKM (Himalica)		
CbA-CRDP-EbA-RKM: 2 (Hariyo Ban)					

3.4.5.1 Community based Adaptation (CbA)

Most adaptation efforts to help countries adapt climate change are focused on national planning and top-down approaches based on climate change modeling. Little attention has been paid to the ways in which poor people have been coping with climate variability and extremes (Reid, 2016). CbA to climate change is a community-led form of proactive adaptation, based on communities' priorities, needs, knowledge, and capacities, which empowers people to plan for and cope with the impacts of climate change (Reid et al., 2009). CbA needs to start working with local communities' expressed needs and perceptions for poverty reduction and livelihood benefits, as well as to reduce vulnerability to climate change and disasters. CbA has been increasingly adopted to operationalize local adaptation (Fenton et al., 2014).

CbA is more frequent in Nepal as higher investment is in place on communities and their socio-economic systems. Out of the 73 CCA interventions outlined in the O1 report, the most 34% (n = 46) were community based or on investments, working at the community level in order to adapt climate change through community-based measures. CbA is well adopted by Nepalese indigenous communities, especially by those living in remote rural areas of Nepal, and who uses their indigenous and traditional knowledge to survive the harsh climate (Gurung et al., 2010). They have been using their knowledge to adapt to both climatic and non-climatic changes for centuries (Berkes et al., 2000). CbA is more pertinent in Nepal, since the poor communities are likely to be worst affected (Reid et al., 2016), because the poor communities tend to be located at rural and remote flood-prone, drought-prone, alpine hazard-prone and landslide-prone steep slopes areas. Furthermore, about two-third of the population depends on agriculture for their subsistence, and most of the communities of highlands is dependent on alpine pastures for cattle grazing and medicinal plant collections. Unpredictable rainfall and erratic precipitation made the communities highly vulnerable. The crop calendar, harvesting calendar and picking sites are no longer coinciding in the changing contexts (Kunwar et al., 2014), affecting communities' abilities to cultivate, produce, collect and use the products for local livelihood. Heat stress, insect, pest and diseases are serious problems that climate change appears to be exacerbating. The ongoing pressure on land, water and soil curtailed the problems (Jennings and McGrath, 2009).

Challenges

While CbA is grounded in community values, coping strategies, priorities and decision-making structures, it cannot operate exclusively at the community level, because other external factors compound the community's vulnerability and their abilities to take actions against climate change. Regmi and Star (2014) emphasized the importance of 'community-centric provisions' to empower local institutions and encourage inclusive decision-making and benefit-sharing for such mainstreaming in Nepal. CbA strategies that take a 'vulnerability first' approach to adaptation have not well been scaled up to inform planning and policy-making across scales (Regmi and Karki, 2010).

Participatory and CbA approaches need time to develop and they need flexible and long-term funding. Understanding the local and communities vulnerabilities needs a lot of time and learning. Thus, the CbA can be time consuming and difficult to achieve, if not invested in time and learning (Forsyth, 2013). We need to ensure that communities are empowered and enabled to participate in identifying priorities, planning, implementing, monitoring, and reviewing adaptation.

Although CbA is a very recent development, a number of lessons and challenges are already emerging around the availability and credibility of climate change information and data. Thus, the quality of participatory processes on CbA is scaling up on monitoring and evaluation. Reaching out the millions of people living in rural remote areas and supporting their genuine participation in any decision-making about resource allocation for CbA is an immense challenge for any programme focusing on adaptation (Reid et al., 2016). It is well admitted that communities, scientists, and development workers need to learn, analyse, and plan action in partnership, but that communities need to be in the driving seat.

There are some challenges in upscaling the CbA projects. Since the CbA is intrigued with local and communities values, it is skeptical on how useful localized perceptions are concerning the risk of future climate change in upscaling in nearby areas where that have not yet been experienced by vulnerable people. Another skeptic is around its transition. How can CbA make the transition from being a largely conceptual approach to adaptation toward being mainstreamed in policy and planning? It's a matter to be dealt with.

CbA clearly adopts the development approach to adaptation, but critics unfold on how the development approach can protect people against their immediate needs, such as food, shelter, health and clothing, and primary needs, such as adapting to landslides, GLOF, flooding, which frequently afflict the poor people. This is the result of indistinct differentiation between development and CCA action. Nonetheless, early succeeds to differentiate and prioritize the needs are under way in Nepal (<http://community.eldis.org/.59d669a8/research.html>). The difference is that the CbA's work seeks to take into account the potential impact of climate change on livelihoods and vulnerability to disasters by leveraging local and scientific knowledge of climate change and its likely effects. It offers a cost-effective way to tackle climate change by capturing the wealth of knowledge and experience of communities in dealing with climate variability.

CbA was first promoted by the British nongovernmental organization (NGO), Practical Action, the Bangladesh Center for Advanced Studies, and the International Institute for Environment and Development (IIED) during the 1990s–2000s. The UK's Institute for Development Studies host a specific CbA Exchange for online debate (ELDIS, 2013, <http://weadapt.org/>.) as well as CbA-specific information on the 'WeAdapt' web portal concerning all adaptation to climate change (Forsyth, 2013). Similarly, the Overseas Development Institute (ODI) has started to examine a local adaptive capacity framework that aims to assess local innovations and governance as means of understanding vulnerability, rather than simply physical risks or assets (Ensor, 2011).

Way forward

It is important to understand how vulnerable people experience risk, and their felt priorities and applied practices are connected with wider processes of social, economic, or political change. Indeed, this challenge might be more difficult in urban or peri-urban locations, where conceptions of 'community' are more transient (Ayers and Forsyth, 2009). CbA presents how local socio-economy and development contexts are important in offsetting the climatic vulnerabilities, and tunes on how participatory techniques and deliberation of different sources of knowledge can lead to more successful outcomes.

Accordingly, CbA scopes the integration of international development and climate change policy in order to achieve more resilient and socially inclusive forms of growth (Pelling, 2011). CbA's future success depends on how participatory and deliberative risk assessment and interventions can reveal the importance of social vulnerability in climate risk, and a wider range of possible adaptation options. Both CbA and EbA initiatives require climate change risk and vulnerability to be central to planning (Reid & Schipper, 2014). CbA seeks to engage with poorer, and more vulnerable, people and allow them to identify and help shape responses to the risks posed by climate change.

Typically, CbA is based on culturally sensitive participatory research methods—comprising interviews, group discussions (sometimes gender specific), observations, etc. CbA may start by identifying communities that are most vulnerable to climate change and cataloguing and capacitating local and indigenous knowledge of climate change adaptation (Kelman et al., 2016). The abundance of Nepal’s indigenous knowledge of climate change was highlighted in early vulnerability assessments, but was not well documented (ADB, 2017).

Incorporation of the Disaster Risk management measures in adaptation strategies are other options directly related to poor communities. The approach of working with CBOs, CSOs, NGOs could be viable in reaching out the poor communities because these organizations have trust of local communities. LAPA is an instrument that is greatly aligned with their goals and is complementarity of CbA. Thus, CbA draws on a number of different fields, including local planning, disaster relief work, local community development work, indigenous knowledge and climate science. Here, science is defined as, ‘science should help people understand themselves as both part of the problem and part of the solution’ (Ghimire et al., 2010). With due consideration of its strength, challenges and way forward situation, the following criteria and options are proposed for a CbA project to have a success (Annex 5). As proposed, six major criteria are to be included and the associated options are to be adopted for a CbA project. This list of criteria and options are suggestive, not comprehensive.

3.4.5.2 Ecosystem based Adaptation (EbA)

EbA is an approach to planning and implementing CCA that takes into account ecosystem services and their benefits for human wellbeing (MEA, 2005; Girot et al., 2012). UNEP defines EbA as the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people and communities adapt to the adverse impacts of climate change at the local, national, regional and global levels. EbA is a policy-mix that has the potential to promote sustainability transitions as it adapts to climate change (Scarano, 2017). EbA has been championed by environment/conservation practitioners and CbA has been supported by development practitioners. Both are people-centered and heralded as ‘bottom-up’ approaches to adaptation, building on the strengths of both to address the shortcomings of mainstream top-down, hard infrastructure-based approaches to adaptation. Like CbA, it has people at its centre, and uses participatory, culturally appropriate ways to address challenges, but there is a stronger emphasis on ecological and natural solutions. Community based resource management practices are entry level points to EbA (Dixit et al., 2015). Thus, EbA is an approach to planning and implementing CCA that incorporates community-based resource management practices to improve ecosystem health and human well-being.

In developing countries where economies depend more directly on natural resources and the provision of ecosystem services (Vignola et al., 2009), EbA could be an useful approach to reduce risks to climate change impacts and to ensure that development proceeds on a pathway that are resilient to climate change (Munang et al., 2013). Mercer et al. (2012) argued that EbA encourages the use of local and external knowledge about ecosystems to identify CCA approaches, recognizes the diversity of local situations and creates a

facilitating environment for effective local adaptation and ecosystem management. There is some evidence to suggest that EbA can be a cost-effective approach to adaptation (Rao et al., 2013) and generate a multitude of social, economic and environmental co-benefits (Doswald et al., 2014). EbA is thus developed to enhance existing indigenous and traditional practices, such as sustainable management of rangelands and pastures, sustainable water management, sustainable forest management through indigenous knowledge, etc. (Khan et al., 2012, Midgley et al., 2012; Roberts et al., 2012).

There are 12 EbA based projects, of them, six (EbA I, EbA II, EbA Scaling up, EbA Kathmandu, EPIC, EbA south-south) are purely based on EbA <https://www.iucn.org/asia/countries/nepal/ecosystem-based-adaptation-mountain-ecosystems>, while the rest (Hariyo Ban, Himalica, BCRWME, MSFP and CCA in CHAL-WWF Nepal) supports capacity development, rural livelihood, policy support and knowledge management through the ecosystem and CbA approaches. Over 67,000 ha land conserved, CCA activities undertaken, and biodiversity conservation has been achieved by the Hariyo Ban project (Seiff, 2017). The project's success offers hope for Nepal to come out from being one of the most vulnerable nations to a successful example of adaptation to climate change. Government projects of SPCR, and agency run projects such as the NCCSP, and Hariyo Ban Programme are being implemented for effective and local level CCA to the vulnerable people of Nepal (Maharjan, 2014).

EbA project was first piloted in Nepal in 2011. EbA in Mountain Ecosystem in Nepal, a pilot project in Panchase area in Western Nepal was launched, in which the MoFSC played an overall coordination role along with the partner organizations, UNDP, IUCN and UNEP. IKI and GEF are the key donors of the EbA initiatives, whereas the latter is more focused on CbA (Huq and Faulkner, 2013). IIED and IUCN are using evidence from the Mountain EbA Project piloted in the Panchase (Nepal) to explore the effectiveness of EbA approaches to CCA and inform and influence national adaptation planning processes (<https://www.iied.org/eba-evidence-policy-nepal>).

Table 19. CCA projects in Nepal work through EbA approach

Project	Fund /Donor Total budget (disbursed budget)	Implementing bodies, duration	Sector/ Theme covered	CCA type	Geographical Cover (in Nepal) and source
EbA in Mountain Ecosystems EBA I	BMUB - IKI Budget: US\$ 3.37 ml	MoPE, MoFSC through DoF; UNDP, UNEP- WCMC, IUCN (2012-2016)	Ag & Fs, For & Wm, DRR, GESI	CbA, EbA, RKM	Panchase Area (Kaski, Parbat and Syangja Districts), Nepal https://pubs.iied.org/pdfs/17482IIED.pdf
Multi Stakeholder Forestry Programme (MSFP) -Enhancing Resilience of Vulnerable Communities to Climate Change	DFID, SDC and Finnish Government US \$ 72 ml	MOFSC, RRN, ECARDS, RIMS, LIBIRD, Rupantaran, IDS and ENPRED (2011- 2016)	For & Wm, Water & Energy, GESI (Livelihood)	CbA, CRDP, EbA	Tehrathum, Dhankuta, Bhojpur, Sankhuwasawa, Okhaldhunga, Khotang, Ramechhap, Parbat, Myagdi, Baglung, Nawalparasi, Kapilbastu, Rupendehi, Salyan, Pyuthan, Dang, Rukum, Rolpa, Kalikot, Jajarkot,

					Dailekh, Bajhang, Accham
Hariyo Ban I	USAID US \$30 ml	WWF, FECOFUN, CARE, NTNC (2011-2016)	For & Wm, GESI, DRR, Research	CbA, CRDP, EbA, RKM	15 districts in TAL and CHAL landscapes, Nepal
Ecosystems Protecting Infrastructure and Communities (EPIC)	BMUB - IKI €4 ml	IUCN, Uni of Lausanne, France, Thailand (2012-2017)	Ag & Fs, For & Wm, GESI, DRR	EbA	Panchase area, Kaski, Parbat, Syangja, Nepal
CCA Interventions in CHAL	WWF Nepal	LI-BIRD (2013-)	Ag & Fs, For&Wm	CbA, EbA, RKM	Gorkha, Lamjung, Tanahun, Kaski, and Syangja districts of CHAL
Support to Rural Livelihoods and Climate Change Adaptation in the Himalayas - Himalica	EU – DFID, GIZ, IDRC €10 ml	ICIMOD, BCN, MoAD, NDRI (2013-2018)	For & Wm, Water, GESI (Livelihood)	CbA, CSA, EbA, RKM	Regional, Nepal https://www.icimod.org/initiative/about-himalica/
EbA through South-South cooperation	GEF-SCCF, C4ES US \$ 0.8 ml	MoFE, Rufford Foundation (2013-2018)	For & Wm,	CbA, EbA	Gorkha, Lamjung, Tanahun, http://c4es.co.za/project-s-2-2/ Bogati and Bhujju (2019)
Building Climate Resilience of Watersheds in Mountain Eco-Regions (BCRWME)	PPCR, ADB (Strategic Climate Fund, Nordic Development Fund) US \$23.54 ml, (\$11.69 ml)	Department of Soil Conservation and Watershed Management, MoFSC (2013-2020)	Ag & Fs, For & Wm, Water & Energy, DRR, GESI	CbA, CSA, EbA	Watersheds in six districts in the Far-Western Development Region: Achham, Baitadi, Bajhang, Bajura, Dadeldhura, and Doti
Hariyo Ban II	USAID US\$ 18 ml	WWF, FECOFUN, CARE, NTNC (2016-2021)	For & Wm, GESI, DRR, Research	CbA, CRDP, EbA, RKM	15 districts in TAL and CHAL landscapes, Nepal
EbA (Scaling up)	BMUB - IKI	TMI, IUCN; MOFE (2018-2020)	For & Wm, DRR, GESI (Livelihood)	CbA, EbA	Panchase Area and Chilime sub-watershed (Rasuwa) https://www.iucn.org/asia/countries/nepal/scaling-mountain-ecosystem-based-adaptation
EbA for climate-resilient development in the Kathmandu Valley, Nepal	LDCE, GEF (ADB, WB/Japan Social Development Fund, GoN) \$38.9 ml (\$6.24 ml)	UNEP, Kathmandu Valley Development Authority (KVDA) (2019- ...)	Urban environment	CRDP, EbA	Kathmandu valley

EbA II	LDCF, GEF- UNEP US \$5.25 ml	MOFE, GEF, UNEP (2019- 2022)	For & Wm	CbA, EbA	Achham, Salyan and Dolakha
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Challenges

The EbA approach is recognized as an important strategy for addressing climate change risk and vulnerability in Nepal (GoN, 2019). However, the approach could not be easily replicated in the mountain communities due to limited accessibility of the mountains (GoN, 2016). EbA is still a developing concept but should be considered alongside adaptation option. The current EbA practices are skewed towards biodiversity and conservation related interventions along with increasing expansion to the DRR area (Scarano, 2017). EbA tools are yet to be mainstreamed as one of the key adaptation interventions for managing missing sectors, such as gender mainstreaming, livelihood, governance and community participation (Huq et al., 2015). The full suite of benefits from EbA usually manifests over a decade. This is particularly the case in systems where tree seedlings take several decades to fully mature. Governments, donors, private sector companies, and research institutions typically do not plan and fund projects over such time frames (Cornell et al., 2013). As a result, there is seldom sufficient information generated from EbA projects to enable policymakers to take well-informed decisions (Druce et al., 2016).

Way forward

As a part of a larger adaptation strategy, EbA accommodates at one or more levels (i.e. local, national, regional, landscape, and sectoral levels) and sectors (forest, watershed, agriculture, capacity building, awareness raising, etc.) at multiple geographic scales (mountains, wetlands, hills, etc.) for multiple benefits towards sustainable development, agriculture, land use, poverty reduction, natural resource management, climate change adaptation, and disaster risk reduction (Bertram et al., 2017). Consequently, concentrating restoration, protection and land management activities in EbA will likely maximize the potential for natural ecosystems to contribute to building social and ecological resilience to climate change, ultimately reducing the vulnerability of the people living in the rural and remote least accessible areas (Bourne et al., 2016). In this respect, EbA should be integrated into existing policy frameworks so that interventions can be sustainable and scalable, rather than short-term and stand-alone. It is prioritized globally by the UNFCCC, CBD, UNCCD and SDG and nationally by the NBSAP (2014) and NFSS (2016) (Table 20).

Table 20. EbA and policy interface

Scale	Policy actions	
Global	UNFCCC, CBD, UNCCD, SDG	Urge governments to comply the commitments
National	Nepal Forest Sector Strategy (2016-2025)	Promote ecosystem-based and community-based resilience measures
	NBSAP (2014-2020)	Designing and implementation of ecosystem based adaptation programmes in the mountains. By 2020, at least 10,000 hectares degraded mountain ecosystems to be restored through participatory approach
	REDD+ (2018)	Enhancing carbon sequestration and climate resilience through both mitigation and adaptation approaches by minimizing the causes and effects of drivers of deforestation and forest degradation, and intensifying sustainable management of forest resources.

The incorporation of governance, participation, livelihood, gender and equity aspects, imperatives of the developing countries like Nepal, is particularly important in EbA practices and absence of these principles may support conventional planning regime, which is ineffective. Pramova et al., (2011) argued to encompass EbA in national adaptation plan so that EbA can bridge the gap of adaptation, development and DRR interventions. The specific criteria and options pertinent to evaluating the success of an EbA project are given in Annex 5.

3.4.5.3 Climate Smart Agriculture (CSA)

Realizing the need for planned efforts to address the challenges of climate change and variability in agriculture and allied sectors, the Government of Nepal has developed a National Adaptation Programme of Action (NAPA), enacted a National Climate Change Policy in 2011 (CCP), and implemented Local Adaptation Plans of Action (LAPAs), among others. Promoting climate-friendly practices in agriculture is one of the strategies set out in Nepal's Nationally Determined Contribution (NDC). Policies related to CCA, agriculture development and food security in Nepal, primarily focuses on the implementation of better agricultural practices and technologies, livelihood diversification and capacity-building activities (MoE, 2010a; GoN, 2011). FAO defines CSA as a way forward for food security in a changing climate. CSA aims to improve food security, help communities adapt to climate change and contribute to climate change mitigation by adopting appropriate practices, developing enabling policies and institutions and by mobilizing required finances (FAO, 2013).

There are 25 CSA related projects in Nepal aimed at developing the resilience and adaptive capacity (ability of systems, institutions and humans to adjust or respond to potential climate change impacts or take advantage of that opportunities) through the adoption of appropriate climate-smart practices and enabling development planning. Among them, five projects supported by the CCAFS and the other five by the FAO, all works to integrate pro-poor adaptation by facilitating agricultural through increasing food security, diversifying livelihoods, and applying climate-smart technologies, and practices and mitigation regimes (Table 21). A CSA up-scaling project funded by CDKN and managed by CCAFS implemented in Kaski, Lamjung and Nawalparasi districts identified a range of context-appropriate practices that have high potential for scaling up within Nepal's various agro-ecological systems and, as they are championed by local authorities, are incorporated into local development plans (Poudel, 2017). The CSA project has generated learning process that have been important for the Government of Nepal to implement the climate-smart village programme (Kunwar, 2017). All three-climate village smart projects were funded by the CGIAR/CCAFS and managed by the LiBIRD.

Table 21. CSA focused projects in Nepal supported by FAO, CCAFS and DFID

Project	Development partners	Implementing agencies	Duration	CCA type	Sector addressed
Community based Biodiversity Management for Climate Change Resilience (CBM for Resilience Project)	FAO	LI-BIRD	2012-2016	CbA, RKM, CSA	Ag & Fs, For & Wm, GESI
Climate Smart Villages (CSVs) I, II	CGIAR/CCAFS	LI-BIRD	2015-2016	CbA, RKM, CSA	Ag & Fs, GESI, Research
Piloting and Scaling-out Climate Smart Villages (CSVs) in Nepal	CGIAR/CCAFS	LI-BIRD	2015-2016	CbA, RKM, CSA	GESI, Urban/rural environment
Scaling Up Climate Smart Agriculture in Nepal (CSA)	CGIAR/CCAFS, CDKN, £ 0.55 ml	LI-BIRD	2015-2017	CSA	Ag & Fs, GESI
Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED-ANUKULAN)	DFID	UK iDE (lead), ADRA, Rupantaran, IWMI, RIMS CIMMYT, RW, MU	2015-2018	CbA, CRDP, CSA	Ag & Fs, DRR
Reducing Vulnerability and Increasing Adaptive Capacity to Respond to Impacts of CC and Variability for Sustainable Livelihoods in Agriculture Sector	LDCF-GEF US \$2.689 ml	FAO, MoAD	2015-2019	CbA, CSA	Ag & Fs
Integrating Agriculture into National Adaptation Planning (NAP-Ag)	BMUB US\$0.7 ml	MoAD, UNDP, FAO	2016-2018	CSA, CRDP	Ag & Fs
Building resilience to landslides and the establishment of early warning systems in Nepal	FAO, USAiD US \$ 0.482 ml	MoFE, MoALD, CRDS	2016-2018	CbA, RKM, CSA	Ag & Fs, For & Wm, DRR
Improving Smallholder Farmers' Rights to Food by Promoting Climate Resilient Technologies and Practices, and Through Policy Advocacy (RTF)	CCAFS, CARE Nepal	LI-BIRD	2017-2018	CSA	Ag & Fs, Research (Climate smart technology)
Climate Smart Villages (CSVs) II	CGIAR/CCAFS	LI-BIRD	2017-2021	CbA, RKM, CSV	Ag & Fs, GESI, Research
GCF-Building a Resilient Churia Region in Nepal (BRCRN)	GCF \$39.3 ml	MoFE, FAO	2019-2027	CbA, CRDP, RKM, CSA	Ag & Fs, For & Wm, DRR

CCAFS seeks to integrate climate change mitigation and pro-poor adaptation by working on changes in agricultural practices by increasing food security, diversifying livelihoods, and reducing GHGs by sequestering carbon or reducing emissions from land use change and fertilizers. Despite its success, it has been claimed that the CSA would promote GHGs mitigation at the expense of food security and adaptation (Neufeldt et al., 2013). The vulnerable farmers might not benefit from land carbon-sequestration (Huq and Ayers, 2008). Thus, developing resilient food production systems that lead to food and income security under progressive climate change and variability and incorporate the immediate needs of vulnerable farmers are urged (Lipper et al., 2014). Thus, CSA options through multi-pronged and multidisciplinary approaches are required in Nepal that take into account the local context (socio-economy and physiography), vulnerable people, the nature of technologies, and synergies and wider partnerships (public-private).

Since Nepalese agriculture is diverse in terms of climatic zones, land use types, food production systems and socio-economic conditions, the CSA also needs to consider these multiple dimensions along with the agricultural production and its traits, including gender, youth and socioeconomically marginalized farmers. While considering these measures, a total of 11 criteria and 28 indicators were proposed for evaluating climate-smart agriculture (Paudel et al., 2017) (Annex 5). Following the proposed criteria and indicators, the following options are proposed at physiographic level in order to have a greater potential for the adoption of CSA and achievements of higher impacts (Table 22).

Table 22. CSA tools at physiographic level (Paudel et al., 2017)

CSA tools	Tarai	Mid-hills	High-hills
Introduction of new crops/seeds	√	√	√
Home garden	√	√	√
Mixed farming	√	√	√
Community seed banks	√	√	√
Handy tools	√	√	√
Insurance	√	√	√
ICT based agro	√	√	√
Cattle-shed improvement		√	√
Plantation and agroforestry		√	√
Plastic pond		√	
Plastic house			√
Multiple use and water source protection		√	
Drip irrigation		√	
Solar based irrigation	√		
Zero tillage, residue retention	√		
Rice intensification	√		

3.4.5.4 Climate-Resilient Development Planning (CRDP)

Climate change poses a threat to sustainable development (IPCC, 2014); so, development efforts must be resilient to the impacts of climate change and associated disaster risks in order to be sustainable. This has been recognized in the 2030 Agenda for Sustainable Development Goals (SDGs-2030) and the Paris Agreement under the UNFCCC; both have drawn links between CCA, DRR and sustainable development. A 2014 World Bank report noted that, in order to end global poverty, attention should be paid not just to growth, but also to the type of growth that increases returns on assets held by the poor. The implication is that climate change policies should be embedded in development policies, not just to ensure economic growth, but also to integrate sustainable resource management, and future climate change effects (Dow and Berkhout, 2014) with a focus on climate change risk, resilience and adaptive capacity (OECD, 2014). The process of mainstreaming climate change agendas into development plans is in its earliest stages and there is very little accepted doctrine on how the process should work. According to ODI (2011), mainstreaming has been described in the context of climate change, as a “holistic” or “development-first” approach, in which adaptation and mitigation objectives are integrated into development agendas. Strategic-level mainstreaming, as defined by CARE (2010), addresses the organizational environment in which policies and programs are planned and implemented. This can include activities, such as building staff awareness and capacities, putting appropriate institutions or mechanisms in place and identifying entry points for adaptation action (Olhoff and Schaer, 2010).

Climate-resilient development is about adding consideration of climate impacts and opportunities to development decision-making in order to improve development outcomes (USAID, 2014). Climate, Resilience and Development are the three main pillars of resilient planning (Figure 9).

Figure 9. Three main pillars of resilient planning (Source: OECD, 2014)



The Climate Resilient Development Planning (CRDP) is one that takes stock of experienced as well as anticipated risks, creates synergy between mitigation and adaptation, improves climate knowledge, and helps improve the governance of development. It provides the opportunity to explore ways to build partnerships among development actors and to devise innovations, which make development works sustainable and cost-effective (NPC, 2011). A key way to advance climate-resilient development is through the integration or mainstreaming of climate change adaptation into plans, policies and strategies in order to achieve sustainable development (OECD, 2009).

In particular, resilience can be increased (= vulnerability reduced) by enhancing the strength of socio-economic systems, reducing the intensity of the impact, or both. Both options for increasing resilience are interlinked to climate actions with humanitarian and development assistance. The climate actions with humanitarian and development assistance come under the climate-resilient development planning.

Climate change considerations in development planning in Nepal

Mainstreaming involves the integration of climate change considerations in planning, budgeting, implementation and monitoring processes (UNDP-UNEP PEI, 2011). Mainstreaming was a priority programme in SPCR 2011 (Saito, 2012). When the NAP process initiated in 2015 accommodated a larger space for mainstreaming, enabling planning and implementation of adaptation at the country level, within the broader development context, it produced many outputs, ranging from local actions, development partner supports, to national policy reform to a series of new protocols that contain adaptation priorities and strategies for the implementation.

Nepal made considerable efforts (prepared NatCom-I in 2004 and II in 2014, National Capacity Self-Assessment report – 2008 and NAPA 2010) in line with the mandates of the UNFCCC and SDG. Climate-Resilient Planning (2011) and Budget code on climate change (2012) eased the process of introduction and integration of climate issues in development planning. GoN endorsed the Climate Change Financing Framework (CCFF) (2017) that prepared a roadmap for mainstreaming climate actions into development plans and budgets, and improve accountability and reporting on the effectiveness of climate investments (GoN, 2017). As the Climate Change Financing Framework (CCFF) (2017) and NCCP (2019) urged the integration of CCA interventions in development planning, the projects enabling institutions, policy instruments, and sustained climate financing, are way forward. These are useful information and processes on which a mainstreaming effort can build on integrating CCA into policy-making and budgeting. Four contexts (Development planning, institutional arrangement, Climate policy and Climate finance) are assimilated, while developing Nepal NAP process (MoFE, 2018).

CRDP projects in Nepal

Among the reviewing of CCA projects (O1 output), 31 projects (out of 73) have been found to be working to support the government to integrate and mainstream CCA in development planning (Table 11). Integration of climate change agendas in development planning in Nepal is at the beginning phase and its learning and challenges are yet to be documented. Mainstreaming/integrating climate change risk and vulnerability to be central to planning is also urged in CbA and EbA (Reid & Schipper, 2014).

In 2008, the GoN had started to assess its vulnerability to climate change and prepare its NAPA to climate change. A climate change project funded by the ADB, “Strengthening Capacity for Managing Climate Change and Environment in Nepal (2009-2012)” which was implemented by WWF US, Practical Action, and MoSTE, Nepal functioned to develop the governments’ capacity and mainstream the climate change agendas into national plans and programmes. The training programs were revised to incorporate climate change and environmental protection modules. Climate Change and Environmental Management

actions were mainstreamed in government training programmes at the national and sub-national levels. This was the first entity to mainstreaming climate change agendas in government document. In 2010, a project jointly funded by the GEF operated LDCF, the UNDP, DFID and the Embassy of Denmark to the GoN for preparation of NAPA, development of NCCMC and MCCRMD. The idea behind the NAPA implementation framework was to build coherence in implementation and mainstreaming of adaptation into the national development agenda.

Table 23. Projects supported to mainstream climate change actions in Nepal

Project	Dev. Partner	Implementing agency	Duration	Theme covered	CCA type	Actions	Cover and source
Strengthening Capacity for Managing Climate Change and Environment in Nepal	ADB \$ 1.115 ml	WWF US, Practical Action MoSTE, \$ 1.275 ml	01.2009-11.2012	Awareness raising & Capacity Dev,	CRDP	Capacity building, policy, research	Nepal https://www.adb.org/projects/documents/strengthening-capacity-managing-climate-change-environment-nepal-tcr
National Adaptation Programme of Action to CC	GEF-LDCF, UNDP, DFID, Embassy Denmark, \$1.1325 (\$0.2)	MoSTE	09.2010	Awareness raising & Capacity Dev, (NAPA)	CRDP	Communication	Nepal https://www.gcfprojects-undp.org/projects/nepal-national-adaptation-programme-action-napa
Mainstreaming Climate Change Risk Management in Development (MCCRMD)	PPCR, WB, ADB, Strategic Climate Fund, Nordic Dev Fund \$7.8 ml (\$5.14)	MoSTE	10.2011-01.2017	Ag & F, Water, GESI, Water & Energy	CRDP	Capacity building; knowledge communication; policy formation and integration	National https://www.adb.org/sites/default/files/project-documents/44168/44168-012-tacr-en_12.pdf
Building Climate Resilient Communities through Private Sector Participation	PPCR, WB- IFC, US \$28.8 ml, cofounding US \$ 19.88 ml (US \$8.7 ml)	MoAD & Private companies; MoFSC, DNPWC & DOF, DHM, DSCWM	2015-2020	Ag & Fs, DRR, Water & Energy, Industry & Transport (Building)	CbA, CRDP	Assessment; capacity building; field implementation	Nepal
Climate proofing growth and Dev. in South Asia	DFID \$28.5 ml ACT (£ 23.7 + UNDP Asia-Pacific £ 4.2)	UNDP, OPML, ACT	10.2012-09.2020	Awareness raising & Capacity Dev, Climate Finance	CRDP, RKM	Capacity building, communication; policy formation and integration through budgeting	Regional, Nepal https://www.opml.co.uk/projects/action-climate-today-proofing-growth-development-south-asia
Supporting Developing	UNDP	MoAD, UNDP, FAO	07.2015-12.2018	Ag & Fs, Awareness	CRDP	Capacity building,	National,

Countries to Integrate the Agricultural into NAP	Budget US\$ 0.42 ml			raising & Capacity dev.		governance, policy,	http://www.fao.org/69epal/programmes-and-projects/project-list/en/
GCF readiness Programme	GCF US \$ 1.5 ml	UNDP, UNEP, MOF (International Economic Cooperation Coordination Division, IEECD)	07.2016-04.2018	GESI, awareness Raising & Capacity Dev, Climate Finance	CRDP, RKM	Policy formation and integration, capacity building	Nepal https://www.gcfreadinessprogramme.org/nepal-gcf-readiness-programme
GCF-Building Capacity to Advance NAP in Nepal	GCF US \$ 3 ml	UNEP, MOFE	11.2018-12.2021	GESI, Awareness Raising & Capacity Dev	CRDP, RKM	Policy formation and integration, capacity building	Nepal https://www.globalsupportprogramme.org/nepal-and-un-environment-launch-gcf-nap-project
GCF-Building a Resilient Churia Region in Nepal (BRCRN)	GCF US\$ 39.3 ml	MoFE, FAO	11.2019-05.2027	Ag & Fs, For & Wm, DRR	CbA, CSA, CRDP, RKM	Field implementation, Capacity building, policy formation and integration	Jhapa, Ilam, Morang, Sunsari, Udayapur, Saptari, Siraha, Dhanusha, Mahottari, Sarlahi and Sindhuli. https://www.greenclimate.fund/project/fp118

Adaptation planning was further supported by the fact that Nepal is one of the nine countries originally invited by the World Bank to participate in the Pilot Program for Climate Resilience (PPCR). The GoN accepted the offer to participate in the PPCR in May 2009, and in March 2010 received a grant of US \$ 225,000 for technical assistance (TA) to prepare its SPCR. It was prepared following the NAPA, and the Three Year Plan (2010-2012). SPCR further bolstered the PPCR. Component 3 of PPCR, Mainstreaming Climate Change Risk Management in Development (MCCRMD) developed knowledge-management tools suitable for CCA and contributed significantly in mainstreaming climate risks and vulnerabilities into development planning. It carried out to help identify indigenous knowledge and local practices; integrate knowledge in policies and plans; and support development works in climate-sensitive sectors in Nepal (MoSTE, 2015b). The identified indigenous local knowledge and practices (ILKP) are useful in climate change adaptation and natural resource management in changing environmental scenario. It trained nearly 800 district planners and provided intensive support to eight line ministries in mainstreaming climate change (ADB, 2017). More than 5,000 farmers have gained access to CCA technologies under the IFC project Building Climate-Resilient Communities through the private sector participation (ADB, IFC and WB, 2015). Despite the initiative taken in 2015, there is a mere engagement of private sectors in CCA adaptation (Sud et al., 2015). This revealed that the current policy environment in attracting private sectors to CCA should be enabled and strengthened.

Another project helped transform the systems of planning and delivery to cope with climate change and disaster risk was Climate Proofing Growth and Development (CPGD) (2012-2020) funded by the DFID and implemented by the OPML/ACT and UNDP. This project helped out First Citizens Climate Budget in Nepal and Climate Change budget code. CPGD supported the study on understanding the demand and supply of climate change knowledge management in collaboration with the Nepal Climate Change Knowledge Management Center (NCKMC) at the Nepal Academy of Science and Technology (NAST). Since then, there is a significant increment in climate financing (NDRI and PRC, 2017). By mainstreaming climate change considerations, the project helped to improve the efficiency and effectiveness of governments to address the climate vulnerability through policy mechanisms (<https://www.opml.co.uk/projects/action-climate-today-proofing-growth-development-south-asia>).

GCF was created to support the efforts of developing countries in responding to the challenge of climate change. Currently, there are unprecedented levels of adaptation finance through the GCF and by multi/bi-lateral donors, and national governments for climate change adaptation (Preston et al., 2011; Termeer et al., 2012). There are three projects in Nepal, funded by the GCF, and all of these projects are subjected to enabling the policy environment and development planning at the central government. The first one, GCF Readiness programme (07.2016-04.2018) worth of 1.5 ml, helped the GoN to access and absorb alternative sources of climate finance, and take forward priorities for climate-resilient development integrating into national plans and policies, such as NAPA, national climate change policies, NAP, National Determined Contributions (NDCs) and sectoral plans.

Under the GCF's Readiness Programme, Nepal received a grant of US \$3 million via the UNEP for preparing country's National Adaptation Plan (NAP). This is also known as Asia's first and Nepal's second GCF-financed project which was approved in November, 2018. This 3-yr project aims to support Nepal to advance its process to formulate and implement its NAP – particularly focusing on climate-sensitive sectors, such as agriculture, infrastructure resilience and food security. GCF recently approved US\$ 39.3 million funding for the third project that builds resilience and mitigates the effects of climate change in Churia region of Nepal (GCF, 2015). The emerging climate scenario demands development plans and programs to be made resilient enough that they can adapt to the changing situation and context. Tompkins and Adger (2010) argued that building resilience into both human and ecological systems is an effective way to cope with environmental changes and this can be achieved and sustained once the climate risks and vulnerabilities actions are adequately integrated into development plans (Table 24, Annex 5). Besides, it is important to analyze options according to a set of criteria that reflect the key considerations relevant to mainstreaming and integrating climate risk and vulnerability actions into development planning.

Table 24. Criteria and associated actions for climate-resilient planning

SN	Miola et al (2015)	USAID 2014 (Criteria* and associated actions)	
1	Type of Natural hazards	Efficiency*	Flexibility
2	Exposure	Effectiveness*	Robustness
3	Vulnerability	Feasibility*	Time realistic

4	Capacity (adaptive, adaptive by gender, coping, and mitigation)	Sustainability*	Least unintended consequences
5	Development	Cost effective*	Co-benefits

3.4.5.5 Research, Knowledge and Management (RKM)

Adaptation to climate change is inherently a process of learning by doing that requires adjustment and innovation over time in response to new information and experiences. In this regard, research, data generation and compilation, and knowledge management is imperative in adaptation governance (Boom, 2005). Limitations on early and direct access and exchange of information and knowledge control participation, and limit success (Domke and Pretzsch, 2016). According to MoFSC, (NAPA 2010), there is limited research on assessing vulnerability, exposure and climate change impact on forests and biodiversity, as they require long-term engagement (Lamsal et al., 2017).

Early warning systems (EWS) are key elements in adapting to climate change and disaster risk reduction. EWS rely on a sound scientific and technical basis and focus on people or sectors mostly exposed to risk. Such systems are in place, in many parts of the world, to monitor, forecast, and warn people about natural hazards, such as floods, storms, extreme heat and cold, forest fires, GLOF, drought, etc. (<https://climate-adapt.eea.europa.eu/metadata/adaptation-options/establishment-of-early-warning-systems>). To be effective and complete, EWS must comprise four interacting elements, namely: (i) risk knowledge, (ii) monitoring and warning services, (iii) dissemination and communication and (iv) response capability (EEA, 2013).

The UNEP works to mobilize existing climate change knowledge and good practices at the global, regional and national levels through Global Adaptation Networks and its Regional Networks. In addition, there are initiatives at the national level in managing the research and knowledge pertaining to CCA. At regional level, Scoping Assessment on Climate Change Knowledge Platform (Adaptation Knowledge Platform) is the first domain (Dixit, 2010) that supports the management of climate change research and capacity building, policymaking and information sharing to help countries in Asia adapt to the challenges of climate change. NAPA, endorsed by the GoN in 2010, had set the objective of developing and maintaining a knowledge management and learning platform. It identified institutional arrangements, e.g. NCKMC, for developing and maintaining a climate change knowledge management and learning platform.

NCKMC was established in 2010 to develop a strong knowledge base on climate change that can be fed into development planning, climate policies, resilience frameworks and vulnerability response mechanisms. NCKMC has since then been facilitating the mechanism through which climate change knowledge is incorporated into policy development and implementation at both national and local level with support from knowledge partners. In 2012, the CPGD project supported the NCKMC in understanding the demand and supply of knowledge management on climate change. Under the MoSTE, this initiative has helped to strengthen the mechanism by which climate change knowledge is incorporated into policy development and implementation at both the national and local level.

There exists a gap between what community need and assistance has been offered by development partners. To address this gap, ICIMOD, together with local development partners (2013-2018) developed the “adaptation highway”. The adaptation learning highway is a strategic process that fosters information and knowledge exchange among communities, scientists and policy makers to better inform the decision-making process and make it more inclusive. Ultimately however, this approach can be used for adaptation and more broadly in development. Thus, this approach is a clear win-win, and a good example of fostering mainstreaming. A crucial part of CDKN’s strategy is the exchange of learning about which approaches are (and are not) working in terms of climate compatible development. Research and knowledge management are the basic principle of CDKN funding.

The government of Nepal has also placed equal emphasis on compiling and analyzing existing data generated by both governmental and non-governmental actors, and on generating new information and frameworks (MoFE, 2018). The Alternative Energy Promotion Centre (AEPC) has established a climate carbon unit to manage knowledge of climate change adaptation and mitigation. The Ministry of Forests and Soil Conservation (MoFSC) has established the Reduced Emission from Forest Degradation and Deforestation (REDD) Cell in 2008 and upgraded it into the Implementation Centre in 2014 to manage knowledge related to mitigation and REDD.

Similarly, the Ministry of Agriculture and Development has established the Agriculture Information Management System (AIMS) to consolidate climate information and develop practical agro advisories. A numbers of projects have been working in Nepal to support the government’s initiative of building resilience and adaptive capacity, and reducing the climate vulnerabilities through generation of data, sharing of information and managing the knowledge (MoPE, 2016b) (Table 25). Early warning, generating new data and information, awareness raising, capacity building, and managing the knowledge, etc. are efficient tools in managing knowledge.

Table 25. Climate change adaptation knowledge management projects

Project	Agency	Knowledge Management
Adaptation Knowledge Platform	UNEP, SIDA, ISET Nepal (2009-2010)	Building bridges between current knowledge on adaptation to climate change and the governments, agencies and communities.
Building Climate Change Awareness in the SA	DFID, CDKN, ICIMOD, PANOS (2012-2014)	Awareness highway, link Knowledge management,
Building resilience to landslides and the establishment of early warning systems in Nepal	FAO, USAiD (2016-2018)	Early warning
Capacity Strengthening of LDC for Adaptation to Climate Change (CLACC)	BMZ, DFID, SIDA (2003 onwards)	Capacity building, Knowledge management
Climate Proofing Growth and Dev (CPGD) in SA	UNDP, OPML/ACT, (2012-2020)	Supported NCCKMC
Community Based GLOF Risk Reduction in Nepal	UNDP, LDCF (2013-2017)	Early warning system, raise awareness
EbA	UNDP, IUCN, MoFE, DoF (2011- 2022)	Generating and exchanging Ecosystem-Based Adaptation (EBA) knowledge

Hariyo Ban	USAID (2011-2021)	Understanding of climate change vulnerabilities and adaptation options
HiAware	DFID, IDRC, CARIAA (2014-2019)	Contributing to policies and practices for enhanced adaptation
Himalica	GIZ, DFID, IDRC, ICIMOD (2013-2018)	Generate knowledge of CC impacts; contributing to policies and practices for enhanced adaptation.
ICCA	iDE, RIMS (2012-2017)	Establishing Community Climate Resource Centres (CCRC), Private sector is enabling sustainable organization of farmers around community managed collection/processing centres for adaptation planning (Colavito, 2014).
LINEX-CCA	BMZ, Germany, LiBIRD (2012-2014)	Capacity building, knowledge management
Mainstreaming Climate Change Risk Management in Development.MCCRMD	PPCR-SPCR-ADB (2011-2017)	Strengthening systems for generating and managing CC knowledge
Monitoring the Impacts of Urban Agriculture on CCA and Mitigation in Cities	CDKN DFID, the Netherland, RUAF foundation (2013-2014)	Awareness raising, Knowledge management
MSFP	DFID, SDC, Finland (2011-2016)	Developing and applying CCA knowledge
NAPA	GEF-LDCF, UNDP-UNEP, DFID, DANIDA (2010)	Establish NCKMC
NCCSP	DFID-GCCA (2013-2023)	Capacity building on knowledge management
Scaling-up Renewable Energy Programme (SREP)	SCF/CIF, AEPC (2014-2019)	Developing APEC as a knowledge for CCA and mitigation
South Asia Water Initiative	UK, Australia, Norway (2013-2017)	Research, capacity building, knowledge management
Strengthening climate change knowledge architecture in Nepal	DFID, CDKN (2011-2012)	Strengthening NCKMC and supporting CCA research through CDKN fund

RKM aims to enable organizations to control, administer, use and share data and information in a secure, efficient and accountable manner, maximizing their impact and return on investment (Griffith University and SPREP, 2016). A better adaptive process can be enhanced through communication and information exchange, thus the new information generated as such must be shared (Nair, 2011). The successful RKM CCA project should consider valuing 1. Recognition of the existing resources and knowledge, 2. Governance, 3. Technology promotion, 4. Resilience building, 5. Long term funding, 6. Innovation seeking and 7. Sustainable management (Annex 5).

3.4.6 Assessment criteria and indicators

Successful adaptation is any adjustment that reduces the risks associated with climate change or vulnerability to climate change impacts, to a reference level without compromising economic, social, and environmental sustainability (Doria et al., 2009). Therefore, successful adaptation practice should embrace the twin objectives of addressing climate risk and vulnerabilities and enhancing the livelihood of poor and vulnerable households (Regmi et al., 2018), as well as the resilience of ecosystem. According to Adger et al. (2005), successful adaptation is what balances effectiveness, efficiency, sustainability and equity through decision-making structures that promote learning and are perceived as a legitimate ideal from which much adaptation inevitably

diverges. Thus, a successful CCA intervention may opt the following criteria and options (Table 26) to be more resilient to our current climate, less susceptible to the impacts of future climate change and able to capitalize on the resulting opportunities.

Table 26. Qualifying criteria for a CCA project

Outcome	Criteria	Options	Reference
Effectiveness	Flexibility	Iterative, changes as needed It can be adapted, revised as needed.	Smith and Lenhart, 1996; Fankhauser et al., 1999; Grasso, 2010
	Robustness	Can opt even in uncertainties	Grasso, 2010
	Effectiveness	Reduction of impacts, exposure, risks, danger or promotion of security	Grasso, 2010; Brooks et al., 2011
Sustainability	Equity	Poorest and most vulnerable groups will disproportionately experience the negative impacts of climate change	Grasso, 2010; Brooks et al., 2011
	Environment-friendly	Do not harm the threshold, future	Fankhauser and Burton, 2011
	Nature-friendly	Commensurate with nature	Noble et al., 2014
	Coherence with policies	Alignment between adaptation and development planning, policies and programmes	World Bank, 2010; Grasso 2010;
	Acceptability	Social, legal, political	Grasso, 2010; Brooks et al., 2011
	No-regrets	Avoid perverse effects, limitations	Jones et al., 2012; UKCIP, 2018
Efficiency	Feasibility	Ease in implementation	Brooks et al., 2011; Raunhaar et al., 2015
	Future benefits	Opportunities	IISD-UNEP, 2009
	Efficiency	Economic, social and environmental benefits	Smith and Lenhart, 1996; Grasso, 2010; Brooks et al., 2011; Noble et al., 2014
	Stewardship building	Increase participation of local communities and their ownership	UNDP and IRAS, 2015

Climate change adaptation can be applied in a wide range of contexts and henceforth lead to a broad range of outcomes (e.g., reduction of disaster risk, reduction of food insecurity, reduction of water scarcity driven by climate change) (Jones et al., [2012](#)), encompassing both social and biophysical impacts (McKinnon et al., 2016). The comprehensive range of adaptation activities precludes the use of a single common indicator to measure adaptation outcomes (Leiter et al., 2019). Thus, the identification of a set of candidate evaluation indicators for adaptation can be complicated. This is because what constitutes success following an adaptation intervention changes over space and time, as climate change impacts differ across sites, temporal and spatial scales, and affects a series of sectors (Spearman and MacGray, [2011](#); Leiter et al., 2019).

The measurement of CCA effectiveness, thus, involves a mix of institutional and behavioral responses, the use of technologies, and the design of climate-resilient plans and climate-smart practices, which balances economic, social, and environmental sustainability. Thus, following the McCarthy et al., (2012), Hammill et al., 2014; GCF (2020) and Donatti et al.,

(2020), the indicators are proposed to measure the CCA outcomes of each interventions (Table 27).

Table 27. Criteria Indicators for measurement of CCA outcomes

Criteria	Indicators	References
Increased resilience of health and well-being, and food and water security	<ul style="list-style-type: none"> • Percentage of total beneficiaries relative to total population • # of persons (male/female) benefiting from introduced health measures to respond to climate-sensitive diseases. • # of food-secure households (in areas/periods at risk of climate change impacts). • # of males and females with year-round access to reliable and safe drinking water supply despite climate shocks. • Uptake of measures to improve water and air quality. • Percentage of land with improved irrigation facility. 	Hammill et al., 2014; Donatti et al., 2020; GCF, 2020
Increased resilience and enhanced livelihoods of the most vulnerable people, communities, and regions	<ul style="list-style-type: none"> • Estimated change in losses of lives of males and females due to the impact of climate-related disasters. • Estimated change in losses of economic assets. • Percentage of population adopting climate- resilient livelihood options (agriculture, tourism, fisheries, etc.) • Average income from sustainable crop and/or livestock production. • Increase access to insurance and financial services. 	McCarthy et al., 2012; Hammill et al., 2014; Donatti et al., 2020; GCF, 2020
Increased resilience of infrastructure and the built environment to climate change threats	<ul style="list-style-type: none"> • Estimated change in losses of infrastructure damages (by satellite images). • # of physical assets constructed and/or made more resilient to climate variability and change. • Value of physical assets constructed and/or made more resilient to climate variability and change. 	McCarthy et al., 2012; Donatti et al., 2020; GCF, 2020
Improved resilience of ecosystems and ecosystem services	<ul style="list-style-type: none"> • Extent of ecosystems strengthened, restored and protected from climate variability and change (by number, area, quality). • Increase in the number of seed (climate resilient) varieties. • # of inventories of climate change impacts on biodiversity. • Conservation of genetic resources. • Area under landscape level conservation. • Soil conservation measures (bioengineering, mulching, organic farming, etc.) 	McCarthy et al., 2012; Hammill et al., 2014; GCF, 2020
Strengthened institutional and regulatory systems for climate- responsive planning and development	<ul style="list-style-type: none"> • # of gender – friendly policies, institutions, coordination mechanisms and regulatory frameworks created or amended that improve incentives for climate resilience and their effective implementation. • # of policy/documents based on modeling scenarios and Vulnerability assessments. • # of technical staff received training on adaptation. 	McCarthy et al., 2012; Hammill et al., 2014; GCF, 2020
Increased generation and use of climate information in decision-making	<ul style="list-style-type: none"> • # of climate responsive products/services in decision-making in climate-sensitive sectors developed, delivered, and used. • # of early warning and health hazard information centers and dissemination outlets. • # of public awareness campaigns on climate change adaptation. 	McCarthy et al., 2012; Hammill et al., 2014; GCF, 2020
Strengthened adaptive capacity and reduced exposure to climate risks	<ul style="list-style-type: none"> • Use by vulnerable households (including number of female beneficiaries), communities, businesses and public- sector services of Fund- supported/developed tools, instruments, strategies, and activities to respond to climate change and variability. 	GCF, 2020

	<ul style="list-style-type: none"> • # of males and females reached by climate- related early warning systems and other risk reduction measures established/ strengthened. 	
Strengthen awareness of climate threats and risk- reduction	<ul style="list-style-type: none"> • # of males and females made aware of climate threats and related appropriate responses. 	GCF, 2020
Crosscutting	<ul style="list-style-type: none"> • # of technologies (including gender – friendly technologies) and innovative solutions transferred or licensed to promote climate resilience. 	GCF, 2020
Tourism, Culture, Industry and Habitats	<ul style="list-style-type: none"> • Percentage of climate resilient roads in the country. • # of new major projects in areas at climate risk. • Funding for climate-adaptation construction. • Percentage of treated wastewater. • # of LEAD buildings. 	Hammill et al., 2014;
Water and Energy	<ul style="list-style-type: none"> • Uptake of riparian tree planting • Priority areas for precautionary flood protection • Adoption of water efficient technologies (water reuse, rain water harvesting, water trench for recharge, etc.) • # of Hydroelectric projects that consider future climate risk. • Energy storage capacity. 	Hammill et al., 2014;

3.4.7 Assessment of CCA project and their best practices at sector level

While most CCA projects follow a multi-level approach, specific interventions (measures, activities) of such projects usually focus on a singular impact level. CbA approach is often facilitated by a local organization and can be implemented like a small-scale development project. The primary objective of the CbA is to improve the capacity of local institutions and communities to adapt to climate change by applying an integrated approach that combines traditional knowledge with innovative strategies. Capacity building and awareness-raising are essential elements of such interventions. CLACC, which is operated by IIED strives to strengthen the capacity of CSOs to adapt to climate change and foster adaptive capacity among the most vulnerable people (IIED, 2015).

NAP is better designed to make best use of strengths of institutions (Dixit et al., 2011). Thus, the CCA projects must follow multi-sectoral approach to risk reduction. The broad range of adaptation characteristics precludes the use of a single common indicator to measure adaptation outcomes (Leiter et al., 2019). Success in adapting to climate change depends on the context. This comprises a complex interlinkage of institutional, socio-economic, governance, social and infrastructural conditions and capacities. Building on the LAPA and lesson learned, guidelines are to be developed for integrating the CCA in sub-national level planning (MoFE, 2018). Based on the review of the CCA projects outlined in Output report 1, and following the criteria and indicators outlined in Table 27, and their qualitative assessment, the best practices of the projects were sorted out to facilitate in devising the consolidated way forward for the CCA interventions and the NAP advancement (Table 28).

Table 28. Best practices and lesson learned of the CCA projects

Theme	Best practices	Planning context	
		Medium-term	Long-term
	* Innovative agro-income based technology and practices and investment on climate- smart technologies projects (e.g. BRACED-ANUKULAN) project.		√

Agriculture and Food Security	* Technical assistance, capacity building and policy advocacy can help the government to tackle the climate risks and can initiate good practices such as climate budgeting in agriculture-related ministries, new systems for expenditure classification and tracking were endorsement (e.g. NAP-Ag).		✓
	* Underutilized resources (plants, areas) can be beneficial to increase food production (e.g. NCCSP I). For instance, crops are being grown in places they were not before and can improve the diets of poor farmers (e.g. ASHA).	✓	
	* Promotion of indigenous crop and varieties that have higher potential to cope with challenges of climate change and food security (e.g. CCCR project).	✓	
	* Sustainable land use management practices are the key to food security.	✓	
	* Improved cattle shed and farm-yard manure (FYM) management can reduce/replace the demand of chemical fertilizers (e.g. CSV projects).		✓
	* Integration of community-based biodiversity management into strategic plans and programs at national, regional and global levels, using grassroots based and scientific processes can help for food security.		✓
	* Low-external-input based practices rather than transfer and adoption of input-intensive technologies and practices is essential.	✓	
	* Micro-irrigation, and plantation of critical species to obtain high yields through SRI technology (system of rice intensification) can help food issues.	✓	
	* De-worming and vaccination of cattle and goats can enhance the food-security at local level.	✓	
	* CSA practices such as off-season vegetable farming (changed the crop calendar) in order to offset the CC impacts could be a good solution.	✓	
	* Community managed agriculture knowledge centers are a key adaptation intervention; they enable communities to assess and seek solutions to climate change and provide grass roots level solutions.	✓	
DRR Management	* Technology can help to make resilient communities through effective and timely communications (e.g. Early warning system in BRACED/DHM project).	✓	
	* Increase meteorological stations and data centers and pools.	✓	
Rural and Urban habitats	* Planned urbanization that incorporates environmental planning, climate smart development and local resource use help reducing vulnerabilities of peri-urban residents (e.g. Water security project).		✓
	* Community-based risk reduction - and encompassing much-needed non-structural risk reduction measures such as early warning systems, awareness-raising, coordinated preparedness and land use planning could help to save the lives of CC impacted people.	✓	
WASH	* Better water access helps better productivity, food security, health and hygiene (e.g. BRACED/ASHA)	✓	
	* Sanitation and hygiene programmes should be promoted.	✓	
Forest, Biodiversity and Watershed Conservation	* Holistic and multi-stakeholder approaches, and multi-sectorial support can be helpful while community level adaptation is more effective (e.g. MSFP).		✓
	* EbA such as watershed management (reforestation, infiltration recharge ponds, small storage tank, and bio-engineering for gully protections) can successfully recharge the watershed area (e.g. BCRWME project).		✓
	* Differential Impact Assessment and Response Planning (DIA-RP) framework should be adopted to identify the impacts, underlying causes and adaptation planning at local level (e.g. Hariyo Ban project)		✓
	* Holistic river basin/watershed management planning is essential for landscape conservation, working at multiple levels.		✓

	* Long-term climate impact studies on biodiversity, forestry, agriculture and water resources.	√	
	* Assist local natural resource management groups (such as CFUGs and LFUGs) in developing plans for CCA.		√
Water Resource and Energy	* Use of climate smart technology such as solar pumps and engineering and technological options can help increase access to water resources.	√	
	* Local institutions should be sensitized, empowered and capacitated for identification, sustainable management and protection of resources (e.g. in ASHA). Adopting the participatory approach can together better manage water and land in an integrated and inclusive (e.g. BCRWME project).	√	
	* Integrated irrigation and drinking water projects are of communities' priority. Thus, capacity development, technology advancement, engineering, and budgeting support should be focused on these areas.	√	√
	* Long-term sub/watershed management plans need to be developed to tackle the water-crisis.		√
	* An isotope study related to hydrological recharge zones of the natural springs could help to understand the water flow situation in climate impact areas (e.g. BCRWME project).	√	
	* Promotion of locally available technology such as rain-water harvesting can help to adapt climate change at local level. Community pond could be useful to address water scarcity at local level (e.g. CSV).	√	√
Industry, Transport and Physical Infrastructure	* Planned urbanization that incorporates environmental planning, climate smart development and local resource use will help reducing vulnerabilities of peri-urban residents (e.g. Water security project).		√
	* Design and promotion of eco-safe roads' create benefits for communities through the generation of extra income to local people (e.g. EPIC project).	√	
	* Investing in Ecosystem based Disaster Risk Reduction and adaptation is "no-regrets" solution.		√
Gender, Equality and Social Inclusion, Livelihoods and Good Governance (GESI)	* The climate resilient farming is useful for diversified income sources and effective to increase coping capacity of vulnerable communities.	√	
	* Improve the management of livelihood assets and natural resources (WFP, Adaptation Fund, 2015).		√
	* Ownership at local level is the key for the programme success and at the same time institutionalization with the government systems can play positive impact (e.g. NCCSP I).	√	
	* Strengthening CSOs and the coordination mechanisms creates synergies among different adaptation actors/actions (e.g. CLACC project).		
	* Income generation is the key aspect to empower the women in the context of CC (e.g. in HIMALICA). Sustainable use and management of non-timber forest products, high-value crops, coffee, and essential oils is important (ICCA project). Lease-based farming could be a good adaptation options (e.g. Mushar community through SAMARTHYA project).	√	
	* Improved nutrition, and women's empowerment as measured by the Women's Empowerment in Agriculture Index (WEAI) can help to adaptation.	√	
	* Community learning approaches contributed directly to the increased self-reliance among communities, groups, and individuals.	√	
Awareness Raising and Capacity Development	* Achieving effective CCA requires institutional strengthening at federal, provincial and local government levels, based on the principle of cooperation, coordination, and coexistence that support climate-resilient development. Intensive engagement and capacity building to local government is immediate need for the better resilient.		√
	Localizing climate adaptation actions has been deeply rooted in planning and implementation (e.g. NCCSP I).		√

	* Skill-based training to local people (e.g. making handicraft from Bans and Nigalo in Mugu - WFP) can help to resilient making to local communities.	✓	
	* Young and children are powerful advocates for CCA process, impacts and adaptation, and need to involve a peer-to-peer learning as an approach to collaboratively addressing climate change.		✓
	* Regular and effective knowledge generation, management centre that ensures the production and dissemination of climate change knowledge information in the country (e.g. NCCKMC)		✓
	* Keeping climate impact marginal people in adaptation planning process can help design a practical adaptation plans.	✓	
	* Help gain access to CCA technologies (BCRC-PSP) (ADB, IFC, WB 2015).	✓	
	* Develop knowledge-management tools suitable for CCA that contribute significantly in mainstreaming climate risks and vulnerabilities in development planning (e.g. MCCRMD project, ADB, 2017).		✓
Research, Technology Development and Expansion	* Existing institution should involve for the long-term research across multiple platforms and institutions such as Tribhuvan University and the Government of Nepal, which can results a positive result (e.g. EbA I).		✓
	* Employing a multimodel ensemble approach helpful for vulnerability mapping of watersheds in mountain regions (ADB, 2012a) (BCRWME).		✓
	* Conduct the interdisciplinary and long-term research on ground-water recharge system, biodiversity, GLOF, climate change impact, vulnerability, adaptation and resilience involving researchers, research institutes, local communities, government and NGOs (Ground water Gangetic basin project).		✓
	* Backstopping support to local stakeholders to adopt CSA practices and technologies to cope with and adapt to the challenges is needed.	✓	
Climate Finance	* Climate finance policies (First Citizens Climate Budget in Nepal and Climate Change budget code, etc.) help order the climate finance (e.g. CPGD)	✓	
Tourism, Natural and Cultural heritage			

3.4.8 Conclusions and Recommendations

3.4.8.1 Conclusions

Nepal has placed CCA high on the national development agenda since 2008, with increased support from development partners. Mainstreaming was bolstered once the PPCR/SPCR projects/components were developed. CCA is now being embedded in planning process and applied through community approaches, nature-based solutions, policy mainstreaming, smart avenues and research and knowledge management protocols. Technological options are being practiced and integrated in existing adaptation responses, such as disaster risk reduction, water management and agricultural productivity. As large number of development partners are engaged in the NAP implementation (at different stages), knowledge sharing, peer-to-peer learning and replication of lessons learned; long-term collaboration among agencies can help make the NAP processes more efficient, effective and innovative (MoFE, 2018).

Erratic climate variability has brought sudden and unprecedented changes and unfamiliar impacts and consequences that are difficult to manage through indigenous knowledge and practices alone. Thus, climate change requires lasting solutions with coordinated and harmonized and integrated interventions in the long run. Integration of indigenous and scientific knowledge and adoption of a hybrid knowledge to improve their adaptation and disaster risk reduction options, especially in the rural settlements is most likely. Since some marginalized and disadvantaged communities, households or individuals are more vulnerable than others, due to differing social, economic and cultural backgrounds, it is essential to consider a gender equality and social inclusion (GESI) window, while advancing the CCA.

Successful adaptation incorporates effectiveness, efficiency, sustainability and equity indicators through decision-making structures, and promotes learning and legitimate ambience, from which, much adaptation inevitably diverges. Thus, a successful adaptation is any adjustment that reduces the risks associated with climate change, or vulnerability to climate change impacts, to a reference level, without compromising economic, social, and environmental sustainability. Effective CCA, thus, involves a mix of institutional and behavioral responses, the use of technologies, and the design of climate-resilient plans, and climate-smart technologies and practices, which balances economic, social, and environmental sustainability. Concentrating restoration, protection, and landscape management through the EbA will likely maximize the potential for natural ecosystems to contribute to building social, economic and ecological resilience to climate change, ultimately reducing the vulnerability of the communities/groups living in the mountains and hills. EbA, therefore should be integrated into existing policy frameworks so that interventions can be sustainable and scalable, rather than short-term and stand-alone. Hitherto, EbA is still a developing concept, of which, tools are yet to be developed/mainstreamed as one of the adaptation interventions for managing livelihood, governance, community participation and gender mainstreaming and its applicability to a wide range of landscape (Huq et al., 2015).

3.4.8.2 Recommendations

The emerging climate scenario demands development plans and programs to be resilient enough so that they can adapt to the changing situation and context. In addition, the development partners need to consider the possibility of better harmonizing and aligning their support to the governmental plan in order to help manage climate finance and efficiently achieve the CCA progress. They can assist by supporting initiatives that strengthen integrated and participatory approaches to the DRR, CCA, and rural development (Sudmeier-Rieux et al., 2012). However, the institutional incapacity of local stakeholders is a major challenge to progress on climate change action. Mapping and capacity strengthening of institutions dedicated to climate change management at every government level (central, provincial and local) would be a good starting point that could generate more ownership and partnership in CCA actions. Besides the reactive actions, proactive actions with preparedness, following the early warning system, long-term research and quality data generation are imperative, as guided by the Climate Change Adaptation and Disaster Risk Management in the Agriculture: Priority Framework for Action (2011–2020) (MoAC, 2011).

The marginalized communities are dependent on local resources, indigenous knowledge and occupational practices to survive the harsh climate as well as chronic deprivation. In this regard, the initiatives acknowledging participatory, community-based and local culture knowledge-friendly measures are likely to be feasible. Vulnerability-first approach to adaptation argued that communities should be at the centre of climate change responses (Cannon and Muller-Mahn, 2010; Ayers, 2011). The approaches that address those communities and their vulnerabilities, risks and challenges should come to the forefront. Ecosystem-based adaptation (EbA) is a nature-based method for climate change adaptation that can reduce the vulnerability of people, natural systems and economies to climate stressors. EbA is said to be especially suitable for addressing the vulnerabilities of at-risk people, including marginalized groups because of the high dependence of these groups on the least accessible mountains and hills where they are living (Munang et al., 2014). Better incorporation of governance, participation, livelihood, gender and equity aspects in EbA efficiently addresses climatic vulnerabilities, effectively increases adaptive capacity and resilience, and is featured with more sustainability, flexibility, implementability and cost-effectiveness (Huq et al., 2015). However, there is a need to test the feasibility of the proposed indicators and promote their use accordingly, so that the understanding of the role of CCA and its specific nature in providing adaptation benefits are developed.

4. Summary

4.1 Conclusions

Climate change adaptation interventions are categorized into community-based practices to government-led programmes to development partners - funded projects. The projects are further categorized into five types, community-based adaptation, ecosystem-based adaptation, climate-smart agriculture, climate-resilient development planning, and research and knowledge management. The CbA is more frequent as higher investment is

in placed on communities and their socio-economic systems, followed by the integration of climate change agendas into development plans.

This report presented a total of 73 project heads ($N = 73$), starting from 2005. Project for vulnerabilities related to human health (WASH) and settlements were underemphasized, coupled with less number of projects on climate financing, private sector involvement and forestry and watershed management. The mere engagement of private sectors in climate change adaptation revealed that the current policy environment in attracting private sectors to CCA should be enabled and strengthened. Besides, the Tourism and Culture Sector, needs an urgent attention, since it did not have any projects nor any planned till date (for climate adaptation though promotion of the tourism and culture.)

Of the 77 districts, six districts, i.e., Parsa, Taplejung, Gulmi, Palpa, Panchthar, and Rautahat have not received any CCA investment so far, in spite of the fact that the former two are highly vulnerable. Bardiya was the only district, which has the highest number of projects ($n = 14$), despite its low climatic vulnerability. These discrepancies need to be resolved while advancing the NAP implementation in Nepal.

Capacity building and awareness raising were the major thrust of the most of the projects, while the projects addressing the vulnerabilities and risks associated with climate change through research and technology adoption were quite low. The current need on investment on research and quality data generation is imperative.

Climate change requires lasting solutions with integrated interventions in the long run. Integration of indigenous and scientific knowledge to improve the adaptation and disaster risk reduction options, especially in rural areas for marginalized and disadvantaged communities and to consider the Community-based and Ecosystem-based adaptations and gender equality and social inclusion (GESI) window are advisable for advancing the CCA.

Successful adaptation incorporates effectiveness, efficiency, sustainability and equity indicators through decision-making structures and promote learning and legitimate ambience, from which, much adaptation inevitably diverges.

4.2 Recommendations

Erratic climate variability has brought sudden and unprecedented changes, and unfamiliar consequences that are difficult to manage through indigenous knowledge and practices alone. Integration of indigenous and scientific knowledge and adoption of hybrid knowledge to improve adaptation and disaster risk reduction options, especially in rural settlements, is most likely. Since some marginalized and disadvantaged communities, households or individuals are more vulnerable than others due to differing social, economic and cultural backgrounds, it is imperative to consider a GESI approach while advancing CCA.

The marginalized communities are solely dependent on local resources, indigenous knowledge and occupational practices to survive the harsh climate as well as chronic deprivation. In this regard, initiatives that acknowledge participatory, nature-based and local culture knowledge-friendly measures are likely to be feasible. EbA is an approach of planning and implementing CCA, considering community-based resource management practices for the betterment of ecosystem health and human-well-being. EbA is considered particularly suitable for addressing the vulnerabilities of at-risk people, including marginalized groups because of the high dependence of these groups on adjacent ecologies (Munang et al., 2014). Better incorporation of governance, participation, livelihood, and gender and equity aspects in EbA efficiently addresses climatic vulnerabilities, effectively increases adaptive capacity and resilience and is featured with more sustainability, flexibility, feasibility and cost-effectiveness (Huq et al., 2015).

Climate change adaptation is being embedded in the planning process. Technological options are being practiced and integrated into existing adaptation responses, such as disaster risk reduction, water management and agricultural productivity. There is also an increasing recognition of the value of social, institutional, and ecosystem-based measures and the extent of constraints to adaptation. The emerging climate scenario demands development plans and programs to be resilient enough so that they can adapt to the changing situation and context.

In addition, development partners need to consider the possibility of better harmonizing and aligning their support with the governmental plan in order to help manage climate finance and efficiently achieve CCA progress. They can assist by supporting initiatives that strengthen integrated and participatory approaches to DRR, CCA, and rural development (Sudmeier-Rieux et al., 2012). With a large number of development partners and global communities engaged in the NAP formulation (at different stages), knowledge sharing, peer-to-peer learning and replication of lessons learned; long term collaboration among agencies can help to make the NAP processes more efficient, effective and innovative (MOFE, 2018). However, the institutional incapacity of local stakeholders is a major challenge to progress on climate change action. Mapping and capacity strengthening of institutions dedicated to climate change management at each government level (central, provincial and local) would be a good starting point for generating more ownership and partnership in CCA actions.

Successful adaptation balances effectiveness, efficiency, sustainability and equity through decision-making structures that promote learning and a legitimate ambience from which much of adaptation is bound to deviate. Successful adaptation is therefore any adjustment that reduces the risks associated with climate change or vulnerability to climate change impacts to a reference level without compromising economic, social, and environmental sustainability. Hence, climate change adaption is a multi-sectoral approach to risk reduction. The broad range of adaptation characteristics precludes the use of a single common indicator to measure adaptation outcomes (Leiter et al., 2019). Therefore, the measurement of CCA effectiveness involves a mix of institutional and behavioral responses, the use of technologies, and the design of climate-resilient infrastructure and climate-smart practices that reconcile economic, social, and environmental sustainability. There is a need to test and promote the feasibility of the indicators proposed here in order to develop a robust understanding of the role of climate change adaptation and its specific nature in delivering adaptation benefits.

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Annex 1. List of Participants in Informal discussion and interviewees

List of Participants

S.N	Name		Gender	Organization	Designation	Email
1.	Abdul Ansari	Inception meeting	Male			
2.	Arun Bhatta, PhD	Inception meeting	Male	MoFE-CCMD	Under Secretary MoFE	apbhatta@hotmail.com
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10.	Hari Prasad Sharma, PhD	Inception meeting	Male			
11.	Johan V Bentinck	Inception meeting	Male			
12.	Kabita Mandal	Inception meeting	Female	UNEP	Communications Consultant, NAP	cavitacabx@gmail.com
13.	Kalyan Gauli, PhD	Inception meeting				
14.	Keshab Goutam, PhD	Inception meeting				
15.	Krishna Prasad Osti	Inception meeting	Male	ASHA Project	Project Coordinator	kposti2000@yahoo.com
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33.	Surendra R Pant	Inception meeting	Male	MoFE-CCMD	Officer, CCMD MoFE	pantsri@yahoo.com
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35.	Yamnath Pokharel	Inception meeting	Male			ynpokharel@gmail.com

Annex 2. Checklist for informal discussion and interview

Programme/Project Name
 Thematic area covered by the project
 Focus of the programmes/project
 Funding/Total budget
 Funding agency/ies
 Implementation/collaborations
 Geographical coverage
 Major interventions
 Adaptation measures
 Adaptation results and impacts
 Success and Lessons
 Risks/Challenges and Way forward
 Costs of measures
 Resource leveraged for the project/programme

Annex 3. List of 73 projects with their basic details

SN	Project	Fund /Donor Total budget (disbursed budget)	Implementing body	Duration	Sector/ Theme covered	Community based adaptation	Climate smart agriculture	CRDP	EbA	RKM	Project Type	Geographic Cover
1.	Adaptation for Smallholders in Hilly Areas (ASHA)	ASAP, IFAD US \$15 ml (\$1.5)	MOFE, MoALD MoFAGA	2014-2020	Ag&Fs, Water & Energy, GESI, Awareness Raising & Capacity Dev.,	CbA	CSA	CRDP			Resilience improvement, Capacity building, research and technology development and piloting	Dailekh, Kalikot, Salyan, East Rukum, West Rukum, Jajarkot and Rolpa
2.	Adaptation Knowledge Platform	UNEP, SIDA	ISET Nepal	2009-2010	Awareness raising and capacity development,					RKM	Capacity building; knowledge communication	Nepal
3.	Adapting to Climate Induced Threats to Food Production and Food Security in the Karnali Region of Nepal	Adaptation Fund US \$ 9.53 ml	WFP, MoSTE, MoFALD	2018-2022	Ag & Fs, DRR, GESI (Gov, Livelihood), Awareness Raising & Capacity Dev.,	CbA	CSA	CRDP			Capacity building; policy formation and integration, agriculture	Karnali: Mugu, Kalikot and Jumla

4.	ANUKULAN Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) – ANUKULAN X	DFID, WHO US \$	iDE (lead), ADRA, IWMI, CIMMYT, RW, MU, Rupantaran, RIMS, SAPPROS, NTAG (6 local)	2018- 2019	Ag & Fs, For & Wm, Health, DRR, GESI, Awarenes s Raising & Capacity Dev.,	CbA	CSA	CRDP			Research, capacity building, disaster risk reduction, Technology transfer for agriculture and forestry	Bardiya, Kailali, Kanchanpur, Doti, Dadeldhura, Surkhet
5.	ANUKULAN: Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED)	DFID through the Building Resilience and Adaptation to Climate Extremes and Disasters program	IDE, UK iDE (lead), ADRA, IWMI, CIMMYT, RW, MU Rupantaran, RIMS	2015- 2018	Ag&Fs, DRR, Awarenes s Raising & Capacity Dev.,	CbA	CSA	CRDP			Field implementation; Research, capacity building,	Kailali, Kanchanpur, Dadeldhura, and Doti of Far-Western and Bardiya and Surkhet
6.	Building Adaptation to Climate Change in Health in LDCs through Resilient Water, Sanitation and Hygiene (WASH)	DFID through ICF £ 6.85 ml	WHO, MoH, MoUD	2013- 2018	DRR, Health, Water & Energy, Awarenes s Raising & Capacity Dev.,	CbA		CRDP			Capacity building; Policy formation and integration; field Implementation	Nepal water safety plan districts: Mustang, Nawalparasi, Dhanusa, Kathmandu
7.	Building Climate Change Awareness in the South Asian Media	DFID and the Netherland	ICIMOD, Panos	05.2012- 03.2014	Awarenes s raising & Capacity					RKM	Communication	Regional, Nepal

		s through the CDKN £ 0.25 ml			Development							
8.	Building Climate Resilience of Watersheds in Mountain Eco-Regions (BCRWME)	PPCR, ADB (Climate Strategic Fund, Nordic Development Fund Grant) US \$23.54 ml (\$11.69 ml)	Department of Soil Conservation and Watershed Management, MoFSC	09.2013-07.2020	Ag & Fs, For & Wm, Water & Energy, DRR, GESI, Awareness Raising & Capacity Dev.,	CbA	CSA		EbA		Research, capacity building, Communication, field implementation	Watersheds in six districts in the Far-Western Development Region: Achham, Baitadi, Bajhang, Bajura, Dadeldhura, and Doti
9.	Building Climate Resilient Communities through Private Sector Participation (BCRC-PSP)	PPCR, WB-IFC, CIF, (PPCR US \$28.8 ml, cofounding US \$ 198.8 m (US \$8.7 ml)	DSCWM, DHM; MoSTE; MoAD & Private companies; MoFSC, DNPWC & DOF	2015-2020	Ag & Fs, DRR, Water&Energy, Industry & Transport (Building	CbA		CRDP			Assessment; capacity building; policy formation, field implementation	Nepal
10.	Building Effective Water Governance in the Asian Highlands	IDRC's Adaptation Research Initiative in Asia, CA\$ 1.526 ml	HELVETAS, Swiss Intercooperation Nepal, Kunming Institute of Botany, World Agroforestry	09.2012-02.0216 01.2015-01.2018	For & Wm, GESI (governance)	CbA	CSA	CRDP			Assessment; knowledge communication	Nepal, Pakistan, China http://asianhighlands.org/
11.	Building Resilience to Climate Related Hazards (BRCH - IBRD)	PPCR, WB and GoN US \$ 31.3 ml (\$17.87)	DHM	01.2013-11.2018	Ag & Fs, Research & Technology, DRR			CRDP			Assessment; capacity building	National http://brch.dhm.gov.np/project-status/

12.	Building resilience to landslides and the establishment of early warning systems in Nepal (BRL)	FAO, USAiD \$ 0.482 ml	MoFE, MoALD, CRDS	09.2016-08.2018	Ag&Fs, For & Wm, DRR, Awareness Raising & Capacity Dev.	CbA	CSA			RKM	Capacity building; field implementation	Darkhu Khola sub-watershed, Nuwakot
13.	Building Resilience to Landslides in Nepal	DFID, NERC, Uni of Geneva, Uni Wageningen, Uni Birmingham, Imperial College, London Budget ??? ???	TU, Practical Action		DRR, Awareness Raising & Capacity Dev.	CbA	CSA			RKM	Research, policy, technology piloting and demonstration, capacity building, knowledge management, agriculture	Along Seti river, Karnali Basin
14.	Capacity Strengthening of LDC for Adaptation to Climate Change (CLACC)	SIDA, DFID-UK, BMZ Budget???	LI-BIRD	2003 onwards (Yearly renewable)	Awareness Raising & Capacity Dev.,					RKM	Capacity building, education and training, knowledge management	National
15.	Child Centered Climate Change Adaptation (4CA) Project	Plan International US \$..	Forum for Rural Welfare and Agriculture Reform for Development (FORWARD) Nepal	02.2014-03.2016	GESI (Children), Awareness Raising & Capacity Dev.,			CRDP			Capacity building, research, knowledge management	Morang, Sunsari
16.	Climate Change Adaptation Interventions in CHAL	WWF Nepal US \$	LI-BIRD	05.2013 – 10.2013	Ag&Fs, For&Wm	CbA			EbA	RKM	Research, policy, livelihoods, agriculture	Gorkha, Lamjung, Tanahun, Kaski, and

												Syangja districts of CHAL
17.	Climate proofing growth and Development in South Asia (CPGD)	DFID –ACT-UNDP US \$ 28.5 ml ACT (£ 23.7 + UNDP Asia-Pacific £ 4.2)	UNDP, OPML, ACT	10.2012-09.2020	Awareness Raising & Capacity Dev., Climate Finance			CRDP		RKM	Capacity building, communication; policy formation and integration through budgeting	Regional, Nepal
18.	Climate Smart Villages (CSVs)	CGIAR/ CCAFS	LI-BIRD	2015-2016	Ag & Fs, GESI, Research, Awareness Raising & Capacity Dev.	CbA	CSA			RKM	Assessment; capacity building; knowledge communication	Bardiya, Dang, Gorkha, Nawalparasi, Mahottari
19.	Climate Smart Villages (CSVs) II	CGIAR/ CCAFS	LI-BIRD	2017-2021	Ag & Fs, GESI, Research, Awareness Raising & Capacity Dev.	CbA	CSA			RKM	Assessment; capacity building; knowledge communication	Nawalparasi, Mahottari, Bardiya
20.	Community based Biodiversity Management for Climate Change Resilience (CBM for Resilience Project)	FAO US \$???	LI-BIRD	2012-2016	Ag & Fs, For & Wm, GESI, Awareness Raising & Capacity Dev.	CbA	CSA			RKM	Research, capacity building, knowledge management	Bara

21.	Community Based GLOF Risk Reduction in Nepal	LDCF-UNDP US \$6.3 (\$6.3)	GON, ICIMOD High Mountain Glacial Watershed Program, UNDP	2013-2017	DRR, GESI, Awareness Raising & Capacity Dev.	CbA,				RKM	Capacity building; knowledge communication; field implementation	12 VDCs in Solukhumbu, Mahottari, Siraha, Saptari and Udayapur districts
22.	Community Climate Change Response (CCCR)	Oxfam Novib, The Netherlands through CTDI, Zimbabwe Budget: US\$??	LI-BIRD	2014-2015	Ag&Fs, Awareness Raising & Capacity Dev.	CbA		CRDP		RKM	Capacity building, advocacy, knowledge management	Tanahu, Gorkha, Dhading
23.	Defining, designing and implementing climate adaptation in the eastern Himalayas: a community based initiative in SHL	DFID-UK, WWF UK	WWF Nepal	2009-2013	For&Wm,	CbA				RKM	Research, knowledge management	Langtang Park and Buffer Zone
24.	Developing climate resilient livelihoods in the vulnerable watersheds in Nepal	LDCF, UNDP-GEF US \$ 7 ml	DoFSC/MoFE/GoN	2020-2024 (ongoing)	Water, DRR, Ag&Fs, Awareness Raising & Capacity Dev.	CbA				RKM	Research, capacity building, field implementation, policy formation and integration, Agriculture	Dudh Koshi River Basin
25.	EbA for climate-resilient development in the Kathmandu Valley, Nepal	LDCF, GEF (ADB, WB through the Japan Social Development	UNEP, Kathmandu Valley Development Authority (KVDA)	08.2019 – ongoing	Urban environment			CRDP	EbA		Climate change adaptation, capacity building, urban environment improvement	Kathmandu valley

		ent Fund, GoN) US \$38.9 ml (\$6.24 ml)										
26.	EbA through South-South cooperation	GEF-SCCF, C4ES US \$ 0.8 ml	Rufford Foundation	2013- 2018	For& Wm, Awarenes s Raising & Capacity Dev.,	CbA			EbA		Capacity building, Agriculture, Forestry restoration	Gorkha, Lamjung, Tanahun, http://c4es.co.za/projects-2-2/ Bogati and Bhaju (2019)
27.	Ecosystem Restoration for Climate Resilient Natural Capital & Rural Livelihoods in degraded Forests and Rangelands of Nepal (EbA II)	LDCF, GEF- UNDP US \$5.25 ml	MOFE, GEF, UNEP		For & Wm, Awarenes s Raising & Capacity Dev.,	CbA			EbA		Research, capacity building, ecosystems and biodiversity conservation, natural resource management	Achham, Salyan and Dolakha
28.	Ecosystem-based Adaptation (Scaling up)	BMUB, Germany Budget????	TMI, IUCN; MOFE	2018- 2020	For&Wm, DRR, GESI (Livelihood), Awarenes s Raising & Capacity Dev.,	CbA			EbA		Research, capacity building, agriculture, energy	Panchase Area and Chilime sub- watershed (Rasuwa District), Nepal https://www.iucn.org/asia/countries/nepal/scaling-mountain-ecosystem-based-adaptation
29.	Ecosystem-based Adaptation in Mountain Ecosystems EBA I	BMUB - through IKI Budget: US\$ 3.37 ml	MoPE, MoFSC through DoF; UNDP, UNEP- WCMC, IUCN	2011-2016	Ag & Fs, For & Wm, DRR, GESI, Awarenes s Raising &	CbA			EbA	RKM	Research, capacity building, technologies piloting	Panchase Area (Kaski, Parbat and Syangja Districts), Nepal https://pubs.iied.org/pdfs/17482IIED.pdf

					Capacity Dev.							
30.	Ecosystems Protecting Infrastructure and Communities (EPIC)	BMUB €4 ml	IUCN, Uni of Lausanne, France, Thailand, Snow and Landscape research	09.2012-08.2-017	Ag & Fs, For & Wm, GESI, DRR				EbA		Research; capacity building; knowledge communication;	Panchase area, Kaski, Parbat, Syangja, Nepal
31.	Enhanced Action of Inclusive CSOs for Participation in Climate Resilient Economic Growth (UTHAN)	EU Budget ????	LiBIRD, Dan Church Aid, Nepal National Social Welfare Association (NNSWA), Social Service Center (SOSEC)	2020-2022	Ag&Fs, DRR, Awareness Raising & Capacity Dev.,	CbA,					Capacity building, governance, policy, livelihoods, agriculture	Kanchanpur, Dailekh http://www.libird.org/app/projects/view.aspx?record_id=87
32.	Enhancing Capacities for CCA and DRM for Sustainable Livelihoods in Agriculture Sector	FAO, TCP, UNDP Budget ??	Department of Agriculture (DOA)	2012-2013	Ag&Fs, DRR, Awareness Raising & Capacity Dev.	CbA				RKM	Capacity building, research, livelihoods, agriculture	Banke and Surkhet
33.	Enhancing Livelihoods and Resilience of Marginal and Resource Poor People of Western Terai and Hills of Nepal (LREP)	NORAD, Development Fund US \$	LiBIRD, SHIP Nepal	2017-2020	Ag&Fs, Awareness Raising & Capacity Dev.,	CbA					Capacity building, research, livelihoods, agriculture	Bardiya, Kailali, Sindhupalchok, Humla
34.	GCF_readiness Programme	GCF US \$ 1.5 ml	UNDP, UNEP, MOF (International Economic Cooperation	07.2016-04.2018	GESI, Awareness Raising & Capacity			CRDP		RKM	Policy formation and integration, capacity building	Nepal

			Coordination Division, IEECD, Ministry of Finance, GoN)		Dev, Climate finance							
35.	GCF-Building a Resilient Churia Region in Nepal (BRCRN)	GCF US \$39.3 ml	MoFE, FAO	11.2019-05.2027	Ag & Fs, For & Wm, DRR, Awareness Raising & Capacity Dev.	CbA	CSA	CRDP		RKM	Field implementation, Capacity building, policy formation and integration, agriculture	Jhapa, Ilam, Morang, Sunsari, Udayapur, Saptari, Siraha, Dhanusha, Mahottari, Sarlahi and Sindhuli.
36.	GCF-Building Capacity to Advance NAP in Nepal	GCF US \$ 3 ml	UNEP, MOFE	11.2018-12.2021	GESI, Awareness Raising & Capacity Dev.			CRDP		RKM	Research, Policy formation and integration, capacity building	Nepal
37.	Groundwater Resilience to CC and abstraction in Indo-Gangetic basin	DFID £0.56 ml	ISSET, Nepal	07.2012-09.2014	Water&Energy, Research (climate information)					RKM	Research; knowledge communication	Nepal, regional
38.	Hariyo Ban I	USAID US \$30 ml	WWF, CARE, NTNC, FECOFUN	2011-2016	For & Wm, GESI, DRR, Research, Awareness Raising & Capacity Dev.	CbA		CRDP	EbA	RKM	Research, capacity building, livelihoods	15 districts in TAL and CHAL: Dadeldhura, Kanchanpur, Kailali, Bardia, Banke, Dang, Nawalparasi, Chitwan, Kaski, Tanahun, Syangja, Manang, Mustang, Lamjung and Gorkha
39.	Hariyo Ban II	USAID	WWF, CARE, NTNC, FECOFUN	2016-2021	For & Wm,	CbA		CRDP	EbA	RKM	Research, capacity building, livelihoods	15 districts in TAL and CHAL landscapes:

		Budget: US\$ 18 ml			GESI, DRR, Research, Awareness & Capacity Dev.							Dadeldhura, Kanchanpur, Kailali, Bardia, Banke, Dang, Nawalparasi, Chitwan, Kaski, Tanahun, Syangja, Manang, Mustang, Lamjung and Gorkha
40.	Health sector capacity enhanced to identify, adapt, and prevent public health problems resulting from climate change	WHO	World Health Organization (WHO)/ Nepal Health Research Council (NHRC)	2010-2011	Health, Awareness & Capacity Dev.,					RKM	Capacity building, policy, knowledge management	Nepal - National
41.	HI-AWARE (Himalayan Adaptation, Water and Resilience)	DFID, IDRC, CARIAA	ICIMOD	2014- 2019	DRR, Water & Energy, Research, Awareness & Capacity Dev.,					RKM	Research; capacity building; knowledge communication	Regional, Nepal (Gandaki River basin)
42.	High Mountains Adaptation Partnership (HiMAP)	USAID Climate Change Resilient Development (CCRD) US \$??	TMI, University of Texas, Austin	03.2012- 06.2015	DRR, Awareness & Capacity Dev.	CbA		CRDP			Capacity building; knowledge communication, local adaptation planning	Solukhumbu, Nepal
43.	Improving Smallholder Farmers' Rights to Food by Promoting Climate Resilient Technologies and	CARE Nepal, CCAFS	LI-BIRD	2017- 2018	Ag&Fs, Research (Climate smart technology),		CSA				Research, policy, capacity building, technology piloting and demonstration	Udayapur, Siraha

	Practices, and Through Policy Advocacy (RTF)				Awareness Raising & Capacity Dev.,							
44.	Initiative for CCA (ICCA)	USAID US \$2.3 ml	iDE, Rupantaran, RIMS	03.2012-03.2017	Ag&Fs, For&Wm, GESI (Governance), Awareness Raising & Capacity Dev.	CbA				RKM	Capacity building; knowledge communication	Nawalparasi, Rupandehi, Kapilbastu, Dang, Rolpa, Syangja, Kaski, and Parbat. https://www.usaid.gov/sites/default/files/documents/1861/SEED%20-%20ICCA.pdf
45.	Integrating Agriculture into National Adaptation Planning (NAP-Ag)	BMUB Budget: US \$0.7 ml	MoAD, UNDP, FAO	2016-2018	Ag &Fs, Awareness Raising & Capacity Dev.,		CSA	CRDP			Research, capacity building, policy support	Three watersheds (Mugu, Dailekh, Bardia)
46.	Kathmandu Sustainable Urban Transport Project	ADB US\$-20 ml GEF US\$ 2.18 ml GoN US \$ 7.9 ml = 30.4 ml	DOTM, DOR, MTPD, Kathmandu municipality (KMC)	07.2010-12.2014	Industry & Transport, Awareness raising and capacity development						Capacity building	https://www.adb.org/projects/documents/kathmandu-sustainable-urban-transport-project-rrp
47.	KSLCDI	BMUB, DFID US \$	ICIMOD, Ministries and CBOs	02.2012-02.2017	For&Wm, Awareness Raising &	CbA		CRDP			Research; capacity building; policy formation and integration;	Baitadi, Darchula, Bajhang, Humla

					Capacity Dev.,						Knowledge management	
48.	Livestock, Livelihoods and Climate Change Interaction: A Collaborative Research in the Gandaki River Basin of Nepal	CRSP, USAID US \$	LI-BIRD, AFU, Department of Livestock Services, Regional Agriculture Research Station at Lumle, Regional Livestock Services Directorate	2012-2015	Ag&Fs, GESI, Awareness Raising & Capacity Dev.,	CbA					Research, capacity building, livelihoods and climate change interaction	Chitwan, Kaski, Lamjung, Manang, Mustang, Nawalparasi
49.	Local Innovation Experimentation-An Entry Point to Climate Change Adaptation for Sustainable Livelihoods in Asia (LINEX-CCA)	BMZ Germany	LI-BIRD	2012-2014	Ag&Fs, GESI (Livelihood), Awareness Raising & Capacity Dev.	CbA				RKM	Capacity building, policy, knowledge management, technology piloting and demonstration	Ramechhap, Siraha
50.	Mainstreaming Climate Change Risk Management in Development (MCCRMD)	PPCR, WB, ADB, SCF, Nordic Dev Fund US \$7.16 ml (\$5.14)	MoAD	10.2011-01.2017	Ag&F, Water, GESI, Awareness Raising & Capacity Dev., Water & Energy			CRDP		RKM	Capacity building; knowledge communication; policy formation and integration	National
51.	Monitoring the Impacts of Urban	DFID, the Netherlands,	RUAF Foundation	02.2013-11.2014	Ag&FS, For&Wm,					RKM	Research; policy formation and	Global, Nepal

	Agriculture on CCA and Mitigation in Cities	CDKN £ 0.2 ml			Research, Urban						integration, agriculture	
52.	Multi Stakeholder Forestry Programme (MSFP) -Enhancing Resilience of Vulnerable Communities to Climate Change	DFID, SDC and Finnish Gov. US \$ 72 ml	MOFSC, RRN, ECARDS, RIMS, LIBIRD, Rupantaran, IDS and ENPRED	2011-2016	For & Wm, Water&Energy, GESI (Livelihood), Awareness Raising & Capacity Dev.,	CbA		CRDP	EbA		Research, capacity building, natural resource management	Terathum, Dhankuta, Bhojpur, Sankhuwasawa, Okhaldhunga, Khotang, Ramechhap, Parbat, Myagdi, Baglung, Nawalparasi, Kapilbastu, Rupendhi, Salyan, Puthan, Dang, Rukum, Rolpa, Kalikot, Jajarkot, Dailekh, Bajhang, Accham
53.	National Adaptation Programme of Action to CC	GEF-LDCF, UNDP, DFID, Embassy of Denmark, US \$ 1.325 ml (\$0.2)	MoSTE	2010	Awareness Raising & Capacity Dev., GESI, Research & Technology			CRDP			Communication	Nepal
54.	NCCKMC	DFID, DANIDA GEF, UNDP	NAST, MoSTE	2009-2010 (center's activities are ongoing)	Awareness Raising & Capacity Dev., Research (Climate information)					RKM	Knowledge management, Sensitization	Nepal

55.	NCCSP I	DFID, EU (DFID 10 ml, EU € 8.6 ml)	UNDP, MoSTE, MoFE, MoFAGA and AEPC	2013- 2017	Ag & Fs, For & Wm, Water&E nergy, DRR, GESI, Health, Awarenes s Raising & Capacity Dev.,	CbA	CSA	CRDP			Capacity building; Environment, Energy	14: Humla, Mugu, Dolpa, Jumla, Kalikot, Dailekh, Jajarkot, Rolpa, Rukum, Dang, Bardiya, Kailali, Bajura, Achham
56.	NCCSP II	DFID Budget: US \$ 2.67 ml	MoFE, MoSTE, Mott MacDonald	02.2019- 07.2023	Ag & Fs, For & Wm, Water & Energy, DRR, GESI, Health, Awarenes s Raising & Capacity Dev.,	CbA	CSA	CRDP			Capacity building; CA, Environment, E	Humla, Mugu, Dolpa, Jumla, Kalikot, Dailekh, Jajarkot, Rolpa, Rukum, Dang, Bardiya, Kailali, Bajura, Achham
57.	NCCSP Transition	DFID US \$ 2.67 ml	UNDP, MoFAGA, MoFE, AEPC	10.2018- 10.2019	Ag & Fs, For & Wm, Water & Energy, DRR, GESI, Health, Awarenes s Raising	CbA	CSA	CRDP			Capacity building; CA, Environment, E	Humla, Mugu, Dolpa, Jumla, Kalikot, Dailekh, Jajarkot, Rolpa, Rukum, Dang, Bardiya, Kailali, Bajura, Achham

					& Capacity Dev.,							
58.	NCCSP-Building Climate Resilience in Nepal	Global Climate Change Alliance US \$9.64 (\$0.67)	MoSTE, MoFALD	Jan 2013 – Dec 2015	Ag&Fs, For & Wm, DRR, GESI, Awareness Raising & Capacity Dev.,	CbA	CSA	CRDP			Capacity building, community incentives	69 VDCs + 1 Municipality in 14 districts in Mid and Far Western
59.	Piloting and Demonstration of Local Adaptation Technologies and Approaches to Address Climate Change Impacts	CARE Denmark, DANIDA	LI-BIRD	2014-2016	Ag&Fs, For&Wm, Awareness Raising & Capacity Dev.,	CbA	CSA				Research, capacity building, piloting and demonstration of technologies	Okhaldhunga, Udayapur, Siraha
60.	Piloting and Scaling-out Climate Smart Villages (CSVs) in Nepal	Research Program on Climate Change, Agriculture and Food Security (CCAFS)	LI-BIRD	2015-2016	Ag&Fs, GESI, Urban/rural environment, Awareness Raising & Capacity Dev.	CbA	CSA			RKM	Research, Capacity building, technology piloting, knowledge management	Mahottari, Nawalparasi, Dang, Bardiya, Gorkha
61.	Promoting Inclusive Governance and Resilience for Right to Food (SAMARTHYA)	CARE Denmark US \$	National Farmers Groups Federation (NFGF), National Land Right	2018-2021	Ag & Fs, GESI (Governance, Livelihood),	CbA	CSA				Research, capacity building, livelihoods, inclusion	Siraha, Udayapur, Okhaldhunga

			Forum (NLRF)/LiBIRD		Awareness Raising & Capacity Dev.,							
62.	Reducing Vulnerability and Increasing Adaptive Capacity to Respond to Impacts of Climate Change and Variability for Sustainable Livelihoods in Agriculture Sector in Nepal	LDCF, GEF US \$2.689	FAO, MoAD	2015-2019	Ag&Fs, Awareness Raising & Capacity Dev.,	CbA	CSA				Field implementation, agriculture	Climate Change Adaptation in Agriculture (GCP/NEP/070/LDF) http://www.fao.org/nepal/news/detail/en/c/1116472/ Arghakhanchi, Siraha, Udayapur, Kapilbastu
63.	Scaling up Climate Resilient Agriculture for Sustainable Livelihood of Smallholder Farmers in Nepal (CRA)	Bread for the World – Protestant Development Service US \$.....	LI-BIRD	2018-2021	Ag&Fs, Awareness Raising & Capacity Dev.,	CbA	CSA				Research, policy, capacity building, Agriculture Technology promotion	Sindhupalchowk, Kaski
64.	Scaling Up Climate Smart Agriculture in Nepal (CSA)	CDKN, CCAFS, CGIAR £ 0.55 ml	LI-BIRD	2015-2017	Ag&Fs, GESI, Awareness Raising & Capacity Dev.,		CSA				Research, policy, capacity building	Nawalparasi, Kaski, Lamjung https://cdkn.org/wp-content/uploads/2017/06/Nepal-agriculture-synthesis-final444.pdf
65.	South Asia Water Initiative	UK, Australia, Norway £11.5 ml	WB	2013-2017	Water, Energy					RKM	Research; capacity building; knowledge communication; policy formation and integration	Regional, Nepal

66.	Southern Voices on Adaptation Climate Change	CARE Denmark	LI-BIRD	2014-2015	Awareness Raising & Capacity Dev.,			CRDP			Capacity building, knowledge management	Global, Nepal
67.	Strengthening Capacity for Managing Climate Change and Environment in Nepal	ADB US \$ 1.115 ml	WWF US, Practical Action MoSTE, \$ 1.275 ml	01.2009-11.2012	Awareness Raising & Capacity Dev.,			CRDP			Capacity building, policy, research	Nepal https://www.adb.org/projects/documents/strengthening-capacity-managing-climate-change-environment-nepal-tcr
68.	Strengthening Civil Society Organization (CSO) and Community Response to Climate Change in Nepal (SCRC)	The Development Fund, Norway US \$	LI-BIRD	2014-2016	Awareness raising and capacity development, GESI (governance)	CbA					Capacity building, governance, policy, livelihoods	Siraha, Okhaldhunga, Dhanusa, Mahottari, Bardiya, Jajarkot, Jumla, Kailali
69.	Strengthening climate change knowledge architecture in Nepal	CDKN £90,000	NAST							RKM	Capacity building; knowledge communication	Nepal
70.	Support to Climate Finance Activities in Nepal	CDKN £40,828	NDRI, PRC	11.2016-02.2017	Climate Finance, Awareness raising and capacity development			CRDP			Capacity building, governance, policy,	National https://cdkn.org/2017/04/opinion-can-nepal-finance-climate-action/?loclang=en_gb http://www.ndri.org.np/wp-content/uploads/2017/10/Country_Situation_Analysis_report_TAS_0072_Final.pdf

71.	Support to Rural Livelihoods and Climate Change Adaptation in the Himalayas -Himalica	EU – DFID, GIZ, IDRC €10 ml	ICIMOD, BCN, MoAD, NDRI	2013-2018	For & Wm, Water, GESI (Livelihood), Awareness Raising & Capacity Dev.	CbA	CSA		EbA	RKM	Research; capacity building	Regional, Nepal https://www.icimod.org/initiative/about-himalica/
72.	Supporting Developing Countries to Integrate the Agricultural Sectors into NAP	UNDP Budget US\$ 0.42 ml	MoAD, UNDP, FAO	07.2015-12.2018	Ag& Fs, Awareness raising and capacity development			CRDP			Capacity building, governance, policy, Agriculture,	National, http://www.fao.org/116epal/programmes-and-projects/project-list/en/
73.	Sustainable Action for Resilience and Food Security (SABAL)	USAID US \$ 59 ml	Save the Children, CARE, LiBIRD, NTAG, NEWAH, DADO, DLSO	10.2014-12.2019	Ag&Fs, GESI, Health, Awareness Raising & Capacity Dev.,	CbA					Capacity building, Agriculture,	11 districts (Makawanpur, Sidhuli, Udayapur, Khotang, Okhaldhunga, Ramechhap, Dolakha, Sindhupalchowk, Kavrepalanchowk, Rasuwa, Nuwakot)
74.	Water Security in Peri-urban South Asia: Adapting to Climate Change and Urbanization	IDRC, Canada Canadian \$	Nepal Engineering College, Center for Postgraduate Studies (NEC-CPS)	2010-	Water, Urban development, GESI	CbA					Research, capacity building, knowledge generation and management, livelihoods, GESI	Peri-urban areas of Kathmandu

Annex 4. Factsheet of 50 selected projects

1. Adaptation for Smallholders in Hilly Areas (ASHA)

Project Name	Adaptation for Smallholders in Hilly Areas (ASHA)
Funding Organizations and Fund	ASAP - International Fund for Agricultural Development (IFAD) Budget: US \$ 37.6 ml
Implementing body, collaborators,	MoFE, MoALD, MoFAGA
Project Duration	2015 to 2020
Research component (Goal, objectives)	Strengthening the framework for local-level climate adaptation and improving the resilience of vulnerable people through channeling project and government financing for implementing LAPA priorities.
Thematic coverage	Ag & Fs, Energy, and GESI (livelihood)
CC adaptation support type	CbA, CSA, CRDP
Project geographic cover in Nepal	Dailekh, Kalikot, Salyan, East Rukum, West Rukum, Jajarkot and Rolpa
Outputs/ Outcomes (Generated services)	84 Sub-watershed Assessment Piloting Ward, 8 Climate Resilient Farming System Tested, 159 Lead Farmer training, 105 LAPA preparation, 71 LAPA implementation, 18736 HHs having Access to Knowledge on Climate Resilient Farming Practice and Livelihood Options, 4756 HHs Using Efficient Water Use, 3657 HHs Practicing Climate Resilient Agriculture
Success story (points)	* Households above poverty lines increased from 38% to 57% through increased household income. * Increased water access helps better health and hygiene.
Lessons learnt	* Frequent monitoring mechanism can enhance the effectiveness of the project activities * Institutional capacity development of local group is equally important, which is to be facilitated by local implementing agencies * Some adaptation activities need a long-time to test and verify at local level. These types of activities should be tested on time to excel the adaptation activities.
Challenges	Weak governance and dynamics within the existing groups/cooperatives, low market led production, quality and sustainability of sub-projects, and no strong monitoring and evaluation system.
Way-forward	*Improved resilient: Improved resilience is an end point, a set of capacities that enable women and men to improve their wellbeing in spite of climate extremes and disasters. * Replication/community buy-in requires projects/interventions that respond to or change the context so that sufficient trust is generated towards the project for people to participate. *Systematic change: At higher levels of the system, strengthening and raising the capacity of key institutional actors with influence at the national level leads to raised awareness and an increased likelihood of socially responsible investment and policy.
Sources/references	GoN 2018. Annual Progress Report of Adaptation for Smallholders in Hilly Areas (ASHA) 2017/2018. Report Submitted to Project Coordination Unit Hattisar, Kathmandu, Nepal www.asha.gov.np

2. Adapting to climate induced threats to food production and food security in the Karnali Region of Nepal

Project Name	Adapting to climate induced threats to food production and food security in the Karnali Region of Nepal
Funding Organizations and Fund	Adaptation Fund/ WFP Budget: US \$ 9.53 ml
Implementing body, collaborators	World Food Programme, MoEST, MoFALD
Project Duration	2018-2022
Research component (Goal, objectives)	Increasing adaptive capacity of climate vulnerable and food insecure poor by improved management of livelihood assets in the Karnali mountain districts of Nepal
Thematic coverage	Ag & Fs, DRR, GESI (governance, Livelihood)
CC adaptation support type	CbA, CSA, CRDP
Project geographic cover in Nepal	Karnali: Mugu, Kalikot and Jumla
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> • 59 Orientation training for the stakeholders • VDC level coordination unit established, project listed, and selection and prioritization, project implementation partners selection and households prioritization • 112 different training conducted and different climate change and food security and information about the climate change and food security related leaf-let, hording board etc produced and disseminated • 20 climate-friendly agricultural practices events • 7 different MUS irrigation system under construction • Feasibility study of 25 different community infrastructures • 27 different skill-based training conducted • 43500 Apples in Mugu and 11800 apple, Peach, Pears and walnut planted in Kalikot.
Success story (points)	* In Mugu, climate impacted people received skilled-based training making handicraft from Ban and Nigalo and produced a good quality products.
Lessons learned	-
Challenges	-
Way-forward	-
Source/References	CAFS-Karnali 2076 BS. Bulletin of Climate Change Adaptation for Food Security in Karnali (CAFS-Karnali) Project, Year 1, (1, 2,3,4,5,6)

3. ANUKULAN Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) Program – ANUKULAN X

Project Name	Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) Program – ANUKULAN X
Funding Organizations and Fund	DFID, WHO Budget??????
Implementing body, collaborators, Led by?	IDE Nepal, ADRA, IWMI, CIMMYT, RW, MU RIMS, Rupantaran Nepal, SAPPROS Nepal, and Nepali Technical Assistance Group (NTAG)
Project Duration	2018 - 2019
Research component (Goal, objectives)	Build their resilience through catalyzing behavioral change in poor, vulnerable rural communities and improving the health, nutrition and livelihood condition with climate smart action.
Thematic coverage	Ag & Fs, For & Wm, Health, DRR, GESI, Dev planning
CC adaptation support type	CbA, CSA, CRDP
Project geographic cover in Nepal	Bardiya, Kailali, Kanchanpur, Doti, Dadeldhura, Surkhet
Outputs/ Outcomes (Generated services)	86 LAPA, 12 early warning systems are established, 91,205 households are cultivating high-value vegetables, 162 new gravity-fed/solar multiple-use water systems, HHs income increased
Success story (points)	* Households above poverty lines increased from 38% to 57% through increased household income. * Solar pumps help to adapt farmers for water for irrigation * Increased water access helps better health and hygiene.
Lessons learned	* Process orientated rather than short-term project based. * Work collaboratively with communities * Capitalising on demonstration effects by early adopters. * Raise capacity of key local institutional actors that helps pool the resources, motivate the marginalized communities. * Emphasising practical demonstration.
Challenges	Process and outcome based projects rather than short-term.
Way-forward	Anukulan X experiences are unique and it can be replicated at the large scale in the similar locations
Source/References	Leavy J, Boydell E, McDowell S, Sladkova D, 2018. Resilience Report Final Evaluation, Synthesis Report. RIMS-Nepal 2017/2018. ANNUAL REPORT of RIMS Nepal 2017/2018. (RIMS-Nepal) P.O. Box: 2464 (Kathmandu).

4. ANUKULAN: Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED)

ANUKULAN: Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED)ANUKULAN: Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) Project Name	ANUKULAN Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED)
Funding Organizations and Fund	DFID through the Building Resilience and Adaptation to Climate Extremes and Disasters program Budget ??????
Implementing body, collaborators	IDE, UK iDE (lead), ADRA, IWMI, CIMMYT, RW, MU – International Rupantaran, RIMS Nepal, SAPPROS Nepal, and NTAG – National Tharu Women Upliftment Center (TWUC), Sundar Nepal Sanstha (SNS), Creation of Creative Society Nepal (CCSN), National Environment and Equity Development Society (NEEDS), Rural Development Service Center (RSDC), and Multipurpose Development Society (MPDS) – Local Partners
Project Duration	2015-2018
Project/Research component (Goal, objectives)	To improve the well-being of rural poor, especially women and children, coping with climate change related shocks and stresses Facilitate the development of sustainable rural organizations around commercial pockets focused on climate smart economic opportunities in agriculture, water resource management, and community forestry Facilitate the harmonization of DRR planning and CCA strategies Empower women and disadvantaged to take leading roles in rural institutions and contribute to economic opportunities; Driving 50,000 small farmer investment in climate-smart technology
Thematic coverage	Agriculture & Food Security, DRM
CC adaptation/support type	DRR/Early Warning Systems (EWS), LAPA
Project geographic cover in Nepal	Kailali, Kanchanpur, Dadeldhura, Doti, Bardiya, and Surkhet
Outputs/ Outcomes (Generated services)	Improve food security and nutrition, and annual incomes for 100,000 households benefitting >500,000 people through CSA facilitated in PPP; CSA – reached 102210 households in the vegetable, essential oil and with conservation agriculture for cereal crops; Water Resources Development – developed 157 Multiple Use Water Systems (MUS) covering 19619 people, facilitated adoption of 21856 HH micro-irrigation technologies; LAPA – facilitated 86 PAPAs covering population of 1496600 people

Success story (points)	<p>*Research partnership to analyze and facilitate climate adaptation policies and approaches; Facilitated conservation agriculture, improved nutrition, and women's empowerment as measured by the Women's Empowerment in Agriculture Index (WEAI); Developed an innovative index to measure climate resilience; Scaled and integrated proven approaches to strengthen climate change resilience for poor and vulnerable households and communities.</p> <p>*successfully completed this year with some significant achievements on enhancing resilience livelihoods and promoting innovative agro-income based technology and practices.</p>
Lessons learned	Community managed agriculture collection centers are a key adaptation intervention; they enable communities to assess and seek solutions to climate change and provide grass roots representation in LAPA process; Water resource development is a key in facilitating community and households technologies to reduce dependence on erratic rainfed agriculture; Child malnutrition is important to address climate shocks and stresses
Challenges	Sustainability of the interventions and increasing the impacts
Way forward	Strengthening the commercial pocket approach to enable access to CSA, develop sustainable rural organizations, access to finance/crop insurance, and agricultural and weather information; Developing PPP approach to leverage resources and technical support for LAPA; Water resource development including micro irrigation, solar PV for lifting, and institutionalizing and scaling the MUS approach; Harmonization of LAPA and DRR under the new Nepal federal structure
Source/reference	https://idenepal.org/Anukulan.html [Accessed 06 July 2020]
Others	

5. Building Climate Resilience of Watersheds in Mountain Eco-Regions (BCRWME)

Project Name	Building Climate Resilience of Watersheds in Mountain Eco-Regions (BCRWME)
Funding Organizations and Fund	ADB, Nordic Development Fund Budget: ADB: US\$ 23.5ml, NDF: US\$ 4.6 ml
Implementing body, collaborators,	MoFSC, DoSWM.
Project Duration	09.2013-07.2020
Research component (Goal, objectives)	Aims to provide access to more reliable water resources for domestic purposes and irrigation for communities living in the watersheds of Nepal's river systems.
Thematic coverage	For & Wm, Ag & Fs, Water & Energy, DRR, GESI
CC adaptation support type	CbA, CSA, EbA
Project geographic cover in Nepal	Achham, Baitadi, Bajhang, Bajura, Dadeldhura, and Doti
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> • 51,278 (318,208 people) households covered have access to improved domestic and irrigation water sources • Water collection increased by 52% on average, ranging from 10.6 to 12 litres/person/day (baseline: 7.1-8 litres/ person/day) in 24 subprojects. • Average time for women/children collection was reduced by 75.39% in batch 1 & 2 subprojects. They spend time before project 3.88- after project 2.93 =0.95 time saving hours/day /household • Batch 1 civil works completed (25 rural village tanks and 67 improved intakes with storage completed). Batch 2 civil works ongoing with 129 storage tanks, 353 improved intakes, 58 irrigation tanks, 42 collection chambers and 37 tap stands completed. Winter planting for Batch 1 catchment restoration works completed and summer planting for Batch 1 and 2 are ongoing. Batch 3 SPFRs are under preparation. • The framework for GIS-based watershed management planning has been prepared. A 5-day GIS training course for mid-level technicians and Class 3 officer Four trainings on basic GIS conducted in April 2016. • A knowledge management plan is being implemented. Hydrological and meteorological stations have been installed and baseline data is being collected. • Training programs for project staff and regularly conducted.
Success story (points)	<ul style="list-style-type: none"> * The project conducted a isotope study related to hydrological recharge zones of the natural springs in the project area. This could be the first research attempt in Nepal. * Some ecosystem-based adaptation such as watershed management such as reforestation, infiltration recharge ponds, small storage tank and bio-engineering for gully protections are the successful to recharge the watershed area.
Lessons learned	<ul style="list-style-type: none"> * Communities and government can together better manage water and land in an integrated and inclusive manner within watersheds * The project needs a enough time for consultation with local people at local level * Supervision and quality control by the project staff is very important to get good results at local level. This can be achieved by providing proper training at local field staff.
Challenges	* Over-load of the local people from the project management activities
Way-forward	
Source/References	ADB 2019. Nepal: Building Climate Resilience of Watersheds in Mountain Eco-Regions. Report no 44214-024 BCRWME 2016. Building reliable water resources for mountain communities vulnerable to climate change. Vol 1. 2016 NDF undated. https://www.ndf.fi/project/building-climate-resilience-watersheds-mountain-eco-regions-bcrwme-ndf-c56

6. GCF Readiness programme

Project Name	GCF Readiness programme
Funding Organizations and Fund	GCF US\$ 1.5 ml
Implementing body, collaborators	UNDP, UNEP, MOF (International Economic Cooperation Coordination Division, IEECD, Ministry of Finance, GoN)
Project Duration	07.2016-04.2018
Research component (Goal, objectives)	Help benefit to the GoN to engage with fund through direct access, strengthen national systems to access and absorb alternative sources of climate finance, and take forward priorities for low-emission and climate-resilient development integrating national plans and policies such as National Adaptation Programme of Action (NAPA), climate change policy, National Adaptation Plans (NAPs), National Determined Contributions (NDC) and sectoral plans.
Thematic coverage	Awareness raising & Capacity building, GESI (Governance)
CC adaptation support type	CRDP, RKM
Project geographic cover in Nepal	Nepal
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> * Enhanced the core institutional capacity of the National Designated Authority (NDA) and National Implementing Entity (NIE) to access, absorb, and manage climate finance. * Developed methodology to select/prioritize vulnerable mountain ecosystems, along with designing of methodology for vulnerability assessment of the Tamakoshi River basin, * Coordinated with the Ministry of Agricultural Development in preparing an investment framework for vulnerable agro-ecosystems in Bardiya, Dailekh and Mugu, led NAP-Ag project * Capacitated to develop 2 national projects
Success story (points)	
Lessons learned	
Challenges	
Way Forward	
Others	
Source/reference	https://www.np.undp.org/content/nepal/en/home/projects/gcf-rp.html

7. GCF-NAP

Project Name	GCF-NAP
Funding Organizations and Fund	GCF, US \$ 3 ml
Implementing body, collaborators,	MOFE
Project Duration	11.2018-12.2021
Research component (Goal, objectives)	*Technical and institutional capacity for the NAP process in Nepal *Climate information system developed and strengthened *Funding strategy for the NAP process including for its implementation *Monitoring, Reviewing and Reporting of the NAP process in Nepal
Thematic coverage	Awareness raising & Capacity building, GESI (Governance)
CC adaptation support type	CRDP, RKM
Project geographic cover in Nepal	Nepal
Outputs/ Outcomes (Generated services)	Review of Climate change adaptation study going on Scope of Capacity building of stakeholders is being assessed.
Success story (points)	
Lessons learned	
Challenges	
Way Forward	
Others	
Source/reference	

8. GCF-Building a Resilient Churia Region in Nepal (BRCRN)

Project Name	Building a Resilient Churia Region in Nepal (BRCRN)
Funding Organizations and Fund	Total \$ 47.3, GCF \$ 39.3
Implementing body, collaborators	MoFE FAO,
Project Duration	11.2019-05.2027
Research component (Goal, objectives)	Enhancing the resilience of ecosystems and vulnerable communities by adopting climate-resilient land-use practices.
Thematic coverage	For& Wm, GESI, Awareness raising & Capacity development
CC adaptation support type	CbA, EbA
Project geographic cover in Nepal	Chure regions, Nepal: Jhapa, Ilam, Morang, Sunsari, Udayapur, Saptari, Siraha, Dhanusha, Ma- hottari, Sarlahi and Sindhuli
Outputs/ Outcomes (Generated services) Key targets	26 vulnerable systems in province 1, 2 & 3 750 CBOs, 200681 households and 963268 people with at least 50% women, 31% indigenous peoples and 13% dalits
Success story (points)	
Lessons learned	
Challenges	
Way Forward	
Others	
Source/reference	

9. Building Effective Water Governance in the Asian Highlands

Project Name	Building Effective Water Governance in the Asian Highlands
Funding Organizations and Fund	IRDC, CA \$ 1.526
Implementing body, collaborators, Led by?	HELVETAS, Swiss Intercooperation Nepal, Kunming Institute of Botany, World Agroforestry
Project Duration	09.2012-02.0216; 01.2015-01.2018
Research component (Goal, objectives)	Effective water resource management in the Asian Highlands by integrating climate change impact analysis with assessments of vulnerability, livelihood options, and water policy.
Thematic coverage	For & Wm, GESI (governance)
CC adaptation support type	CbA, CSA, CRDP
Project geographic cover in Nepal	China, Nepal Pakistan
Outputs/ Outcomes (Generated services)	Increased flows of new information about climate change, Reduced gaps in understanding about resilient adaptations of local people.
Success story (points)	Evaluated the role of evolving hybrid forms of adaptive knowledge for coping with environmental and social change.
Lessons learned	Communities in highlands still need assistance from states to better adjust to climate change and socioeconomic impacts Appreciating local knowledge is not enough, enfranchising people with representative decision-making and resource rights and responsibilities is also required so that people can employ that knowledge toward climate adaptation.
Challenges	Climate change actions must include more targeted state support for locally evolving hybrid knowledge, behaviours and institutions.
Way Forward	In context of reducing risks from climate change for both communities and governments, more effort must be made to sensitize leaders and policy makers to the interface between local and national interests. Government policy should avoid blanket solutions and target specific hybrid knowledge systems in specific places. Enhanced political representation with significant resource control for highlands peoples must be established sooner rather than later.
Others	
Source/reference	https://www.idrc.ca/en/project/building-effective-water-governance-asian-highlands https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/53428/IDL-53428.pdf [Accessed 14 July 2020]

10. Building Resilience to Landslides in Nepal

Project Name	Building Resilience to Landslides in Nepal
Funding Organizations and Fund	DFID, NERC, Uni of Geneva, Uni Wageningen, Uni Birmingham, Imperial College, London Budget?????
Implementing body, collaborators, Led by?	TU, Practical Action
Project Duration	????????
Research component (Goal, objectives)	*Using citizen science and participatory approaches to generate knowledge, which will increase local disaster resilience. * Generating maps and forecasting landslide triggers by combining satellite data with community-based environmental sensing.
Thematic coverage	DRR
CC adaptation support type	CbA, CSA, RKM
Project geographic cover in Nepal	Seti river, Karnali Basin
Outputs/ Outcomes (Generated services)	*polycentric approach to disaster risk reduction *Utilize emerging open-source, cloud-based, risk-analysis platforms to build polycentric early-warning systems
Success story (points)	Citizen science for hydrological risk reduction and resilience building
Lessons learned	When embedded with a polycentric approach toward risk governance, citizen science could complement more traditional knowledge generation practices, and also enhance innovation, adaptation, multidirectional information provision, risk management and local resilience building
Challenges	Inaccessibility and sparseness of water-related datasets, as well as development of new technology Future of citizen science lies not in mere data collection, but rather its integration with information processing and feedback.
Way forward	Combine ‘measurement-oriented’ and ‘citizen hydrologist’ approaches with the powerful tools developed in other projects for data mining the social media contents and conducting spatial analysis of VGI
Others	
Source/reference	https://practicalaction.org/wp-content/uploads/2019/07/LANDSLIDE-EVO-fact-sheet.pdf [Accessed 14 July 2020] https://onlinelibrary.wiley.com/doi/full/10.1002/wat2.1262 [Accessed 14 July 2020]

11. Building Resilience to Landslides and the establishment of early warning systems in Nepal (BRL)

Project Name	Building resilience to landslides and the establishment of early warning systems in Nepal
Funding Organizations and Fund	FAO, USAID; US \$ 0.482 MI
Implementing body, collaborators	MoFE, MoALD, CRDS
Project Duration	09.2016-08.2018
Research component (Goal, objectives)	Establish safer agricultural livelihood strategies and community-based early warning and preparedness systems
Thematic coverage	Ag&Fs, For & Wm, DRR
CC adaptation support type	CbA, CSA
Project geographic cover in Nepal	Darkhu Khola sub-watershed, Nuwakot
Outputs/ Outcomes (Generated services)	*774 households through various input support and 631 people through trainings. * Enhanced communities' capacity in identifying risk areas and ability to implement local solutions.
Success story (points)	Community resilience through the protection and rehabilitation of agricultural land and infrastructure if effective.
Lessons learned	Increased government partners' decision-making power and capacity in landslide treatment and mitigation, backed up by practical experience in low-cost local technologies and best practices that can be applied to other at-risk areas.
Challenges	Mainstreaming community-based disaster risk management practices in their regular development programmes
Others	
Source/reference	https://reliefweb.int/sites/reliefweb.int/files/resources/OSRO%20NEP%20602%20USA%20Project%20Highlights.pdf www.fao.emergencies Dominique Burgeon, Director, Emergency and Rehabilitation Division. TCE-Director@fao.org, Somsak Pippopinyo, FAO Representative, Nepal. Somsak.Pippopinyo@fao.org

12. Building Climate Change Awareness in the South Asian Media

Project Name	Building Climate Change Awareness in the South Asian Media
Funding Organizations and Fund	DFID through CDKN, £ 250,000
Implementing body, collaborators,	ICIMOD, PANOS
Project Duration	05.2012-03.2014
Research component (Goal, objectives)	Increase capacity of media to produce quality climate reporting
Thematic coverage	Awareness raising and capacity development
CC adaptation support type	RKM
Project geographic cover in Nepal	
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> * Improved sources for information to write the stories * Facilitated debate and discussion in the policy sphere * created multiple and new voices in Climate change reporting
Success story (points)	<p>Networking of media personals and journalists working on climate change awareness in the South Asia</p> <p>500 stories on climate change</p> <p>Establishment of an online platform – the Panos South Asia Climate Change Blog at http://climatechange.panosouthasia.org/</p> <p>Capacity building of journalists in covering the climate change issues and stories</p>
Lessons learned	<p>Better ways of communicating about climate change through different media</p> <p>Effective reporting on climate change issues</p>
Challenges	State of the media in a precarious position in South Asia, several journalists are moving away from media jobs with salary and budget cuts affecting their positions and survival
Way Forward	A mid-project, course correction, face-to-face interaction between the fellows and the mentors would have injected even more enthusiasm into the project
Others	
Source/reference	https://cdkn.org/wp-content/uploads/2012/09/140429-final-impacts-assessment-and-country-studies-2.pdf

13. Building adaptation to climate change in health in least developed countries through resilient water, sanitation and hygiene (WASH)

Project Name	Building adaptation to climate change in health in least developed countries through resilient water, sanitation and hygiene (WASH)
Funding Organizations and Fund	DFID International Climate fund, £ 6.85 ml
Implementing body, collaborators, Led by?	WHO, MoH, MoUD
Project Duration	2013-2018
Research component (Goal, objectives)	support the development of effective plans for climate change adaptation in the health sector
Thematic coverage	DRR, Health, Water & Energy
CC adaptation support type	CbA, CRDP,
Project geographic cover in Nepal	Mustang, Nawalparasi, Dhanusa, Kathmandu
Outputs/ Outcomes (Generated services)	H-NAP, 2015 Water Safety Plans
Success story (points)	* Enhanced mobilization of funds to support climate resilient WASH initiatives. (Two additional projects, namely, DFID II and Global Environment Facility funded “ <i>Building resilience of health systems in Asian LDCs to Climate Change</i> ” have been approved) .
Lessons learned	* Climate risks require careful assessment and management from design stage to implementation * Adequate funding is required to support the provision of climate resilient infrastructure * More research and documented evidence is required
Challenges	* Limited capacity and WASH priority in Development plans are less emphasized.
Way Forward	* Scale-up climate resilient water safety planning activities * Conduct additional research on impacts of climate change on health sector
Others	
Source/reference	https://www.who.int/globalchange/resources/wash-toolkit/nepal-climate-change-health-wash.pdf?ua=1

14. Building Resilience to Climate Related Hazards (BRCH)

Project Name	Building Resilience to Climate Related Hazards (BRCH)
Funding Organizations and Fund	WB and GoN (US \$ 31 ml)
Implementing body, collaborators, Led by?	Department of Hydrology and Meteorology (DHM)
Project Duration	01.2013-11.2018
Project/Research component (Goal, objectives)	To transition Nepal's hydro-meteorological services into a modern service-oriented system that will build resilience today as well as adaptive capacity for future, To enhance government capacity to mitigate climate related hazards by improving the accuracy and timeliness of weather and flood forecasts for disaster preparedness by the general population and warnings for climate vulnerable communities, To support agricultural management information system services to help farmers mitigate climate-related hazards
Thematic coverage	Ag & Fs, DRR, Research & Technology Extension
CC adaptation/support type	CRDP, RKM
Project geographic cover in Nepal	Whole Nepal
Outputs/ Outcomes (Generated services)	Constructed 3-towered (10 storied, 5 storied and 5 storied building at Babarmahal; Implemented and commissioned weather radar at Birendranagar-13, Ratanangla, Surkhet; Modernization of 70 hydrological stations and 88 meteorological stations; Implemented and commissioned Lightning Detection Network at Tumlingtar, Biratnagar, Simara, Bhairahawa, Pokhara, Nepalgunj, Surkhet, Attariya and TIA; Implemented and commissioned END to END Early Warning System at Koshi and Rapti Rivers; Agriculture Management Information System (AMIS)
Success story (points)	0.47 Skill Score for Weather Forecast Verification System in 2075 after its establishment in 2075; 51% overall satisfaction among users and 49% among climate/weather vulnerable users; Establishment of laboratory to calibrate meteorological equipment
Lessons learned	
Challenges	Human resources and coordination to operate all the facilities Sustainability of funding for all the initiatives Rapid changes in personal involved in different responsibilities under the project
Way forward	Coordination with NARC and AMIS/PMU to interact with farmers and agriculture experts for the optimum utilization of AMIS Engagement of different stakeholders in the utilization of data and information
Source/reference	BRCH Project. 2076. Bulletin of Building Resilience to Climate Related Hazards (BRCH) Project. Vol. 4, No. 1, pages 1-4 http://brch.dhm.gov.np/ [Accessed 04 July 2020]
Others	

15. Child Centered Climate Change Adaptation (4CA) Project

Project Name	Child Centered Climate Change Adaptation (4CA) Project
Funding Organizations and Fund	PLAN International Budget ?????
Implementing body, collaborators,	Forum for Rural Welfare and Agriculture Reform for Development (FORWARD)
Project Duration	02.2014 - 03.2016
Project/Research component (Goal, objectives)	To contribute to local community to build safe and resilient society through active participation of child and youth for managing and reducing the risks of climate change
Thematic coverage	DRM, Awareness raising and capacity development, research & technology extension
CC adaptation/support type	CSA, CRDP
Project geographic cover in Nepal	Sunsari and Morang districts
Outputs/ Outcomes (Generated services)	4 TOT on CSDRM for teachers, SMC, PTA; established 257 resource persons at community level; conducted 180 peer classes; conducted 19 PCVA in community for CCA; produced 8 IEC materials; organized 20 awareness events; conducted 19 orientation events to student and teachers on weather data recording; formulated 19 LDRMP and CDRMP; established 4 mini weather stations; organized 3 child led national level workshop on sharing with NAPA knowledge.
Success story (points)	Increased the awareness and capacity of children, youth and communities to climate change and associated disasters, thereby facilitating the 4CA processes
Lessons learned	Peer-to-peer learning as an approach to collaboratively addressing climate change Children and young people are powerful advocates and leaders on CCA in their communities and leaders
Challenges	Sustainability of environmental and economic benefits of the activities on communities' governance capacity and government support require further interventions (refresher trainings, technical support, support to mobilize future finances) or formal incentives (government mandates e.g. integration of CCA in curriculum)
Way forward	
Source/reference	https://www.forwardnepal.org/capacity-building-children-and-youth-managing-and-reducing-climate-change-risk-o file:///C:/Users/CDES/Downloads/2013_act_to_adapt_en.pdf https://www.forwardnepal.org/sites/default/files/Child%20Centered%20Climate%20Change%20Adaptation%20%284CA%29%20%28Februar y%202014%20-%20March%202016%29_o.pdf
Others	

16. Climate Smart Villages (CSVs) II

Project Name	Climate Smart Villages (CSVs) II
Funding Organizations and Fund	Research Program on Climate Change, Agriculture and Food Security (CCAFS) Budget ??????
Implementing body, collaborators	CGIAR, LI-BIRD
Project Duration	2017 - 2021
Research component (Goal, objectives)	<ul style="list-style-type: none"> • A necessity for generating more convincing evidences about economic, environmental and social benefits of the approach. • Urgency of supporting the local institutions like farmers groups/solar user groups that are involved in piloting CSVs for a sustainable plan. • Exploring the co-learning and co-evaluation opportunity through government's national CSV initiatives • Necessity of documenting the learning, good practices and results of the project and disseminate them widely.
Thematic coverage	Ag & Fs, Governance, GESI, , Livelihood
CC adaptation support type	CbA, CSA, RKM
Project geographic cover in Nepal	Nawalparasi, Mahottari, Bardiya, Dang
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> • Ensuring Flagship and new projects will yield long-term evidence and lessons • Extraction and sharing of knowledge and evidence • Building local capacity to replicate successful approaches • Informing local, national, and international adaptation plans and policies
Success story (points)	* Solar based Irrigation System: A boon to farmers in enhancing their livelihood, resilience and adaptive capacities.
Lessons learned	* LiBIRD carried out an travelling impact assessment from the local, provincial and federal government in which participants were able to lobby and influence to prioritize and integrate CSA and CSV into relevant policies and plans at the local and provincial level.
Challenges	Unavailability and unaffordability of technologies (such as solar-based irrigation system)
Way-forward	Climate smart technologies should be made available in an affordable cost to the farmers. Government should allocate certain programmes for the deployment of solar based irrigation system and provide it in an affordable price so as to support the small household farmers.
Source/References	http://www.libird.org/app/news/view.aspx?record_id=72 [Accessed 14 July 2020]

17. Climate Smart Villages (CSVs) I

Project Name	Climate Smart Villages (CSVs) I
Funding Organizations and Fund	Research Program on Climate Change, Agriculture and Food Security (CCAFS) Budget ????
Implementing body, collaborators	CGIAR CCCAFS/LI-BIRD
Project Duration	2015 - 2016
Research component (Goal, objectives)	Aims to pilot, test and evaluate two CSV models (i. CSV model with solar-based irrigation, ii. CSV model without solar-based irrigation) in five climate-risk agro-ecological regions and develop a comprehensive implementation guideline to facilitate scaling up of CSV models
Thematic coverage	Agriculture, food security, livelihood
CC adaptation support type	CbA, CSA, RKM
Project geographic cover in Nepal	Rupandehi, Mahotari, Nawalparasi, Dang, Barrdia, Gorkha
Outputs/ Outcomes (Generated services)-	<ul style="list-style-type: none"> • CSV models and CSA practices and technologies piloted, tested and evaluated • Evidence related to economic, social and environmental impacts of CSV models generated and documented • Financial, policy and institutional mechanisms for scaling out CSV models developed • Operational plans and implementation strategies for facilitating scaling out different CSV models prepared • The solar-based irrigation system with and without solar system is being piloted in another 18 villages. • Some key interventions in both models comprised of weather smart, water smart, carbon smart, nutrition smart, knowledge smart and energy smart and methods. • Altogether, project plans to provide direct support to 600 farming households, while there will be another 1,800 households as the secondary beneficiaries. Project aims to maintain at least 50% of women beneficiary during direct interventions.
Success story (points)	<ul style="list-style-type: none"> • Majhthana VDC is turning into a Climate-Smart Village
Lessons learned	<ul style="list-style-type: none"> • Improved cattle shed and farm yard manure (FYM) management can reduce/replace the demand of chemical fertilizers; • A community pond could be useful to address water scarcity at local level
Challenges	Affordability and availability of technologies such as solar-based irrigation
Way-forward	<ul style="list-style-type: none"> • Solar-based irrigation should be promoted in the similar geographical localities.
Source/References	<ul style="list-style-type: none"> • LiBIRD 2016. Scaling-Up Climate Smart Agriculture & Climate Smart Village in Nepal: Policy Discourse in the Making. http://www.libird.org/app/news/view.aspx?record_id=44

18. Climate proofing growth and Development in South Asia

Project Name	Climate proofing growth and Development (CPGD) in South Asia
Funding Organizations and Fund	DFID, (£ 28.49)
Implementing body, collaborators, Led by?	OPML/ACT, UNDP
Project Duration	10.2012-09.2020
Research component (Goal, objectives)	* Transform the systems of planning and delivery to cope with climate change and disaster risk *Build the climate change knowledge of decision makers
Thematic coverage	Awareness Raising and Capacity Development, Climate Finance
CC adaptation support type	CRDP
Project geographic cover in Nepal	National
Outputs/ Outcomes (Generated services)	Climate change budget code 2017
Success story (points)	First citizen's climate budget in Nepal to share information with public
Lessons learned	* It is crucial to thoroughly understand the context and its political economy. *Responding to demand-driven initiatives as far as possible offers greater likelihood of achieving real ownership. *Useful to work with UNDP APRC which can build on its existing Public Financial Management (PFM) programmes
Challenges	Developing capacities for climate finance reforms is challenging. Building capacity in this area requires sophisticated skills and approaches to knowledge management and sharing. Establishing sustainable reforms to planning and budgeting processes will require long term approaches.
Way Forward	*Develop a sustainability strategy *Gender and social inclusion should be strengthened including through the wider application of the gender toolkit
Others	
Source/reference	http://www.fao.org/134epal/programmes-and-projects/project-list/en/

19. Climate Change Adaptation Interventions in Chitwan Annapurna Landscape

Project Name	Climate Change Adaptation Interventions in Chitwan Annapurna Landscape Budget?????
Funding Organizations and Fund	WWF Nepal (through USAID funded Hariyo Ban Programme)
Implementing body, collaborators, Led by?	Local Initiatives for Biodiversity, Research and Development (LI-BIRD)
Project Duration	05.2013 – 10.2013
Project/Research component (Goal, objectives)	Build community and ecosystem resilience to climate change through preparation of community adaptation plans and sensitization of civil society organizations in the landscape.
Thematic coverage	Ag& Fs, For & Wm
CC adaptation/support type	EbA, RKM, CbA
Project geographic cover in Nepal	Gorkha, Lamjung, Tanahun, Kaski and Syangja districts
Outputs/ Outcomes (Generated services)	16 community adaptation plans of actions (CAPAs) with 16 Community Forest User Groups (CFUGs)
Success story (points)	Sensitization of civil society organizations (NGOs, CBOs, FECOFUN district chapters) in climate change, its impacts and response strategies, and their roles in the communities
Lessons learnt	Building resilience of communities through identification of local climate and livelihoods context and bottom up approach planning for facilitating integrated adaptation approaches
Challenges	Landscape is prone to a number of localized climatic hazards (e.g. prolonged droughts, erratic rainfall, flash floods, glacial lake outburst floods, landslides, forest fires etc.) and associated with low level of awareness and capacity on the part of local community to adapt to climate change, which leads to low agricultural and ecosystem productivity
Way forward	Identifying local climate and livelihoods context and integration of climate adaptation approaches through bottom-up planning
Source/reference	http://www.libird.org/app/projects/view.aspx?record_id=47 [Accessed 04 July 2020]
Others	

20. Community based Biodiversity Management for Climate Change Resilience (CBM for Resilience Project)

Project Name	Community based Biodiversity Management for Climate Change Resilience (CBM for Resilience Project)
Funding Organizations and Fund	FAO Budget ????
Implementing body, collaborators, Led by?	Local Initiatives for Biodiversity, Research and Development (LI-BIRD)
Project Duration	2012-2016
Project/Research component (Goal, objectives)	Contribute to strategic plans promoting the use of the Community Based Methodology as a strategy for strengthening on-farm management of plant genetic resources and building resilience through community-oriented processes involving 26 grassroots' organizations associated with resource poor and vulnerable farmers
Thematic coverage	Ag & Fs, For & Wm, GESI (Livelihoods)
CC adaptation/support type	CbA
Project geographic cover in Nepal	Bara
Outputs/ Outcomes (Generated services)	Participatory diagnoses of climate threats affecting 26 sample sites and trials to test the best adaptive options available from a bottom up perspective
Success story (points)	Integration of community-based biodiversity management into strategic plans and programs at national, regional and global levels, using grassroots based and scientific processes Community biodiversity management fund
Lessons learnt	Enhance the capacity of a new generation of scientists by providing support to graduate students and increasing the agro-biodiversity conservation workforce
Challenges	Scaling-up and replication of the results and knowledge generated across the country Enhancing awareness of the value of local biodiversity Enhancing the capabilities of communities to document, monitor and take control over their genetic resources
Way forward	Engagement of different stakeholders including researchers, students and community leaders in awareness enhancing activities Capacity building of local communities to document, monitor and take control of genetic resources
Source/reference	
Others	

21. Community Based Flood and Glacial Lake Outburst Risk Reduction in Nepal

Project Name	Community Based Flood and Glacial Lake Outburst Risk Reduction in Nepal
Funding Organizations and Fund	LDC fund (US \$ 16.11 ml including co-financing)
Implementing body, collaborators	DHM/MoEST/GON, ICIMOD, High Mountain Glacial Watershed Program, UNDP, GEF
Project Duration	2013-2017
Project/Research component (Goal, objectives)	Reduce human and material losses from GLOF in Solukhumbu district and catastrophic flooding events in the Terai and Churia Range Help the Government of Nepal to overcome some of the key barriers to managing the growing risks of GLOFs and flooding in the Terai and Churia Range of southern Nepal with a strong emphasis on community engagement, empowerment and social inclusion
Thematic coverage	DRR
CC adaptation/support type	CbA
Project geographic cover in Nepal	Khumbu Valley, Churia Range and Terai
Outputs/ Outcomes (Generated services)	Installed an automated and community-based early warning and response system – 6 prime settlements downstream from Imja lake, another 18 systems along 50 km of river banks downstream from Imja lake (Dudh Koshi River); Institutionalized a disaster response system by training local community at risk and government officials on GLOF risks and ways to respond in case of disaster – trained 38 officials, formed 12 taskforces, conducted ToT producing 20 local resource persons, developed a ToT manual on GLOF risk reduction; Supported local communities at risks in the southern plains to take flood risk mitigation measures to build their resilience to floods/monsoon – constructed 7.4 km flood proofing drainage system, constructed and handed >35 elevated tube wells, operationalized 15 community-based early warning systems (CBEWS).
Success story (points)	Successfully completed the world's highest altitude climate adaptation project at the Imja Glacier lake, which included installing a community-based disaster risk reduction system and lowering the water levels. Over 90,000 people downstream are made safer with this project; Lowered the water level of one of the most dangerous glacial lakes, Imja, by 3.4 meters, reducing the risk of glacial lake outburst floods (GLOF). The lake was 148m deep in 2015.
Lessons learned	Focus on community-based risk reduction - and encompassing much-needed non-structural risk reduction measures such as early warning systems, awareness-raising, coordinated preparedness and land use planning.
Challenges	Activities are constrained by mountain terrain Sustainability of the initiatives especially capacity building and mobilization of local DRM committees.
Way forward	UNDP forged a partnership with the International Centre for Integrated Mountain Development (ICIMOD) to pilot test a community-based flood early warning systems in Ratu River. Developed and disseminated Sediment Monitoring Protocols for collecting and analyzing sediment data from Churia originating river systems, to help the Government to design risk mitigation measures
Source/reference	https://www.adaptation-undp.org/projects/ldcf-glof-nepal [Accessed 06 July 2020]
Others	

22. Community Climate Change Response (CCCR)

Project Name	Community Climate Change Response (CCCR)
Funding Organizations and Fund	Oxfam Novib, The Netherlands through Community Technology Development Trust (CTDT), Zimbabwe Budget ????
Implementing body, collaborators, Led by?	Local Initiatives for Biodiversity, Research and Development (LI-BIRD)
Project Duration	2014-2015
Project/Research component (Goal, objectives)	Explore the interactions between farmers' livelihoods and their changing environment Develop and promote ways for them to create better options to produce food, acquire income and improve their livelihoods
Thematic coverage	Awareness raising and Capacity building, research and technology extension
CC adaptation/support type	CbA, RKM
Project geographic cover in Nepal	Tanahu, Gorkha, Dhading
Outputs/ Outcomes (Generated services)	Practices and methods of conserving, managing and developing PGR on-farm like Participatory Plant Breeding (PPB) and Participatory Varietal selection (PVS), Community based biodiversity management, home garden management
Success story (points)	There are a number of indigenous crop and crop varieties that have higher potential to cope with challenges of climate change in which most our farmers still depend on for food security. Interrogating farmers' perceptions of climate change, comparison of these perceptions with 30-60 year meteorological data, assessing what crop diversity has been lost, what was the reason/cause for these losses, whether farmers felt the impacts of the losses and what strategies they think should be put in place to bring back the lost diversity
Lessons learned	Practices and methods need to be further adapted, shared with research and academic institutions and scaled up to reach policy makers so that they make decisions on the revising climate change and respective agricultural policies in the country
Challenges	Lack of attention and investment for improving and enhancing the use values of local resources limit its wider potential use for climate change adaptation
Way forward	Collaborate with institutions of higher learning (Relevant agricultural colleges and universities) in the country and start making contributions to curriculum development, capacity building of teaching staff and research students
Source/reference	http://www.libird.org/app/projects/view.aspx?record_id=59 [Accessed 04 July 2020]
Others	

23. Ecosystem-based Adaptation (EbA) in Mountain Ecosystems I

Project Name	Ecosystem-based Adaptation (EbA) in Mountain Ecosystems I
Funding Organizations and Fund	Government of Germany - BMUB Budget: USD 3.37 ml, Budget: USD 3.37 ml
Implementing body, collaborators,	IUCN, UNEP, UNDP, MoFSC/Department of Forests (DOF)
Project Duration	2011-2016
Research component (Goal, objectives)	Aimed at strengthening the capacity of three mountainous countries viz. Nepal, Peru and Uganda which are particularly vulnerable to the impacts of climate change. More specifically, the project try to develop methodologies and tools for EbA decision-making in mountain ecosystems, apply the EbA methodologies and tools at the ecosystem level, implement the EbA pilots at ecosystem level, and develop the business case for EbA at the national level
Thematic coverage	Ag & FS, For & Wm, DRR, GESI (Governance)
CC adaptation support type	CbA, CSA, EbA
Project geographic cover	Kaski, Parbat and Syangja districts
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> • 54500 plants planted on 65 ha area of Panchase Mountain Ecological Region (PMER) conserving ecological region and benefitted 2496 households • 31 natural water sources protected benefitting 1542 households and PMER • 35 traditional pond conserved benefitting 1800 households • 32 gully and landslide protected through gabion wall construction and green structure benefitting 1819 households • 5 river bank protection activities held in around 180m area benefitting 292 households • 6 sites of river restored with grey green structure benefitting 156 households • 6 nurseries of Timur and Chiraito planted 46000 seedlings • 32 forest fire control and management trainings conducted and 547 local participants benefitted • 27 invasive species management trainings conducted and 694 local people benefitted • 5 women empowerment trainings conducted benefitting 162 local women • 10 exposure visits organized benefitting 311 local people and stakeholders • 10 soil management trainings conducted benefitting 527 local participants
Success story (points)	* Long-term research across multiple platforms and institutions such as Tribhuvan University and the Government of Nepal which can results a positive sign for the future long-term data generation.

Lessons learned	<p>* EbA approaches must be able to harmonize among science- based analysis of vulnerabilities of ecosystems and communities while the field-based activities at the local can be driven by taking account of traditional and indigenous knowledge.</p> <p>* The EbA approach is widely recognized as an important strategy for adapting to the impacts of climate change, however, the approach could not be easily replicated in the mountain communities due to limited accessibility of the mountains.</p>
Challenges	<p>* Uncertainty of climate change, data gaps of social context and risks associated in replication of the EbA approaches is still challenge of the project.</p>
Way-forward	<p>*CC impacts can only be planned for a predicted climate scenario and within the boundaries. Working with such scenario enables better, participatory and effective planning process.</p> <p>*EbA options identified must take account of the local context such as identification of species for land degradation treatment and plantations of degraded lands to ensure sustainability of conservation or management practices</p> <p>*The social-environmental contexts of the vulnerability must be addressed. They need to be integrated towards understanding the community context and addressed the vulnerabilities of communities to climate change</p> <p>*Planning at both upstream and downstream should therefore not be separate.</p>
Source/References	<p>IUCN (2018). Scaling of Mountain EbA. Nepal Mountain Ecosystem Based Adaptation to Climate Change Briefing Sheet.</p> <p>Government of Nepal / Department of Forests/ United Nations Development Programme (2016). Project Completion Report of Ecosystem based Adaptation in Mountain Ecosystems in Nepal Project. Project Completion Report. May 2016.</p> <p>IUCN (2012). Scoping of Piloting Ecosystem based Adaptation in Panchase: A Report. Report published under 'EbA in Mountain Ecosystem' Project, jointly implemented by IUCN, UNDP and UNEP with financial support from BMUB.</p> <p>IUCN (2013). Hydrogeological Study in Bangsing Deurali VDC, Syangja. Report published under 'EbA in Mountain Ecosystem' Project, jointly implemented by IUCN, UNDP and UNEP with financial support from BMUB.</p> <p>IUCN (2013). Impact Assessment of Invasive Plant Species in Selected Ecosystems of Bhadaure Tamagi VDC, Kaski: An Ecosystem-based Adaptation in Mountain Ecosystem in Nepal. Report published under 'EbA in Mountain Ecosystem' Project, jointly implemented by IUCN, UNDP and UNEP with financial support from BMUB.</p> <p>IUCN (2013). Biodiversity Resource Inventory, Ecosystem Assessment of Bhadaure Tamagi VDC, Kaski: An EbA in Mountain Ecosystem in Nepal. Report published under 'Ecosystem-based Adaptation in Mountain Ecosystem' Project, jointly implemented by IUCN, UNDP and UNEP with financial support from BMUB.</p> <p>https://www.nepjol.info/index.php/HN/article/view/13271</p>

24. Ecosystem-based Adaptation in Mountains – (Scaling up)

Project Name	Scaling Up Mountain Ecosystem-based Adaptation – EbA 2
Funding Organizations and Fund	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUB) - through its International Climate Initiative Budget: US \$
Implementing body, collaborators	MoFE, The Mountain Institute (TMI) and IUCN, Agriculture, Livestock Development, Federal Affairs and Local Development —The Central Department of Environmental Science at Tribhuvan University —The Social Welfare Council
Project Duration	2018-2020
Research component (Goal, objectives)	This project is designed to consolidate and replicate effective and sustainable EbA measures in Mountain Flagship sites. The project will directly and indirectly contribute to ecosystem resilience, sustained ecosystem services, reduced disaster risks, and diversified and sustainable livelihoods — all underpinning climate change adaptation.
Thematic coverage	For & Wm, DRR, GESI (Livelihood)
CC adaptation support type	CbA, EbA
Project geographic cover in Nepal	Kaski, Parbat and Syangja Districts) and Chilime sub-watershed (Rasuwa District), Nepal
Outputs/ Outcomes (Generated services)- Expected	Ensuring the Flagship and new projects, yield long-term evidence and lessons; Extraction and sharing of knowledge and evidence; Building local capacity to replicate successful approaches; Informing local, national, and international adaptation plans and policies
Success story (points)	Build support for EbA approaches in mountains, both on the ground and in national and international policy; Other evidence and feedback so that government policies related to environmental protection and livelihoods support can be strengthened and implemented at all levels
Lessons learned	NRM groups such as Community Forestry User Groups and Leasehold Forestry User Groups, Women's Groups and others are key to the projects The livelihoods of the local people depend on a healthy ecosystem
Challenges	Local communities and groups have been historically discriminated against both socially and economically such as the Dalit and indigenous groups including <i>Janajatis</i> .
Way-forward	Assist local natural resource management groups (such as CFUGs and LFUGs) in developing a plan for specific EbA activities that address some of their key vulnerabilities.
Source/References	https://www.iucn.org/asia/countries/nepal/scaling-mountain-ecosystem-based-adaptation [Accessed 05 July 2020]

25. Ecosystem-based Adaptation for climate-resilient development in Kathmandu Valley, Nepal

Project Name	Ecosystem-Based Adaptation for climate-resilient development in the Kathmandu Valley, Nepal
Funding Organizations and Fund	GEF (ADB, WB through the Japan Social Development Fund, GoN) Budget ?????
Implementing body, collaborators, Led by?	UNEP, Kathmandu Valley Development Authority (KVDA)
Project Duration	August 2019 - ongoing
Project/Research component (Goal, objectives)	EbA is implemented in the Kathmandu Valley to promote: i) water conservation and groundwater recharge; ii) soil stability, particularly along roadsides and in areas with high risk to slope failure; and iii) climate-resilient livelihoods
Thematic coverage	Urban environment
CC adaptation/support type	EbA, CRDP
Project geographic cover in Nepal	Kathmandu Valley
Outputs/ Outcomes (Generated services)	*Capacity of national government and local municipalities to integrate EbA into development planning in the Kathmandu Valley increased *Knowledge and awareness on EbA of local communities living in the Kathmandu Valley enhanced Local communities in the Kathmandu Valley implementing EbA to manage the effects of climate change
Success story (points)	
Lessons learnt	
Challenges	Institutional capacity to coordinate the implementation and upscaling of EbA interventions; resources allocated to EbA in government development plans, policies and strategiesevidence to demonstrate the benefits of EbA to policy- and decision-makers; understanding of local urban communities of the benefits of EbA because of few on-the-ground examples.
Way forward	
Source/reference	https://www.thegef.org/sites/default/files/project_documents/ID8009__rev_NEPAL_Kathmandu_Valley_PIF_30.12.2014_highlighted__1_1_0.pdf [Accessed 06 July 2020}
Others	

26. Ecosystem-based Adaptation in Mountains – (EbA II)

Project Name	Scaling Up Mountain Ecosystem-based Adaptation – EbA 2
Funding Organizations and Fund	Least Developed Countries Fund (LDCF), GEF-UNEP \$5.25 ml
Implementing body, collaborators	MoFE, GEF, UNEP
Project Duration	2019-2022
Research component (Goal, objectives)	Build on the good practices and lessons of the earlier two EbA projects and consequently contribute to the long-term sustainability of the baseline projects in the face of climate change. The project has three components; component 1 will strengthen the national capacity to plan and implement EbA, component 2 will support a policy environment that promotes EbA across Nepal, and component 3 will demonstrate on the ground EbA interventions to restore degraded forests and rangelands.
Thematic coverage	For & Wm, DRR, GESI (livelihood)
CC adaptation support type	CbA, EbA
Project geographic cover in Nepal	Acham, Salyan, Dolakha
Outputs/ Outcomes (Generated services)- Expected	
Success story (points)	
Lessons learned	
Challenges	
Way-forward	
Source/References	

27. Ecosystems Protecting Infrastructure and Communities (EPIC)

Project Name	Ecosystems Protecting Infrastructure and Communities (EPIC)
Funding Organizations and Fund	Germany Federal Ministry of the Environment; Nature Conservation; and Nuclear Safety (BMUB) Intl Climate Initiative Budget €4 ml
Implementing body, collaborators, Led by?	IUCN, University of Lausanne, France, Thailand, Snow and Landscape research
Project Duration	09.2012-08.2-017
Project/Research component (Goal, objectives)	To catalyse and quantify the role of ecosystems in protecting vulnerable communities against the risks associated with climate change and natural hazards. In Nepal, the project falls within the specific context of rural earthen roads, exacerbating erosion and landslide risk in the Panchase area
Thematic coverage	Ag&Fs, For&Wm, GESI, DRR
CC adaptation/support type	EbA
Project geographic cover in Nepal	Panchase area, Nepal
Outputs/ Outcomes (Generated services)	Gather empirical evidence on the value of ecosystem based approaches to landslide and erosion reduction through three pilot sites – documented role of earthen roads in contributing to increased erosion and landslides, quantified role of vegetation in reducing erosion rates, studied plant survival rates and climate resistance; Demonstrated the value of ‘eco-safe roads’ through an economic cost-benefit analysis comparison with grey roads Built national and local level capacity to promote implementation of Eco-DRR; Created multiple benefits from soil bio-engineering, with focus on enhancing livelihood opportunities
Success story (points)	3 soil bio-engineering pilot sites were established and maintained using local knowledge of most appropriate plant species and techniques for low cost soil bio-engineering such as drainage and dry wall construction; >120 participants trained on Eco-DRR with specific case of ‘eco-safe roads’; 3 nurseries were established which distributed the plants to vulnerable communities, and created skills and additional income for community members
Lessons learned	*‘Eco-safe roads’ create benefits for communities through the generation of extra income (e.g. use of grasses and shrubs for fodder, sale of brooms from Amriso (<i>Thysanalaena maxima</i>), and fruits planted on previously unproductive and unstable roadside land; Low cost and locally available deep rooted grasses supplemented by local materials for stabilisation and drainage are available; *Investing in “eco-safe roads” is cost-effective *Investing in Ecosystem based Disaster Risk Reduction and adaptation is “no-regrets” solution
Challenges	Good governance, enforcement and implementation of ‘Eco-safe roads’, Eco-DRR
Way forward	Considering the strategic importance of rural access roads, it is imperative that roadside soil bio-engineering, proper drainage and design become standard practice rather than the highly costly heavy equipment, and post monsoon clean up approach for conventional “grey” unplanned rural roads
Source/reference	https://www.iucn.org/sites/dev/files/content/documents/epic_policy_brief_29_sep_4.pdf [Accessed 06 July 2020]
Others	

28. Enhancing Capacities for Climate Change Adaptation and Disaster Risk Management for Sustainable Livelihoods in Agriculture Sector

Project Name	Enhancing Capacities for Climate Change Adaptation and Disaster Risk Management for Sustainable Livelihoods in Agriculture Sector
Funding Organizations and Fund	UNDPFAO, TCP Budget ?????
Implementing body, collaborators, Led by?	Department of Agriculture (DOA) and the District Agriculture Development Offices, Banke and Surkhet
Project Duration	2012-2013
Project/Research component (Goal, objectives)	Assist MoAC and DOA/DLS in testing and operationalizing the process of shifting from a reactive emergency response focused intervention approach towards a pro-active natural hazard risk prevention/preparedness oriented approach in agriculture sector
Thematic coverage	Ag & Fs, DRR
CC adaptation/support type	CbA, RKM
Project geographic cover in Nepal	Banke and Surkhet
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> * Crop improvement for stress tolerance, Agronomic management and cultural practices (mixed/inter cropping practices, oyster mushroom production), Resource conservation (Dhaincha – <i>Sesbania</i> sp – green manuring), * Management of high and low temperature stress, * Soil and water conservation and erosion control (SALT technologies), * Water harvesting and water management, Restoration of degraded community resources, Risk related seed storage and maintenance (improved seed storage methods), * Fodder/forage and livestock management, Alternate energy use and reduction in GHGs, Capacity building training, visit and workshop of farmers/stakeholders (>80 farmers benefitted), *Publication of good practices on CCA and DRM and priority framework of actions (2011-2020)
Success story (points)	<ul style="list-style-type: none"> *Rain water harvesting, micro-irrigation, plantation of <i>Jatropha</i> in 10 ha of land by >500 farmers, farmers have been able to obtain high yields through SRI technology (system of rice intensification), *De-worming and vaccination of >500 cattle and goats in each district, Improved gender balance and equality by involving about 40% of the women farmers
Lessons learned	<ul style="list-style-type: none"> *Developing programmes based on community needs and constraints – *Identify, develop and implement programmes on CCA and DRM in agriculture based on needs, constraints and adaptive capacity of local communities particularly the vulnerable groups
Challenges	<ul style="list-style-type: none"> *Actions and strategies for improving food security, *Integration coordination, linkage and networking – immediate, medium and long-term adaptation strategies and actions are required easing food shortages and food insecurity in the vulnerable districts
Way forward	<ul style="list-style-type: none"> *Awareness raising and capacity building, Identification and prioritization of major hazards/risks and local adaptation/coping strategies, mainstreaming gender and inclusive participation, *Adopting a pro-active preparedness-oriented adaptation approach
Source/reference	FAO. 2013. Enhancing capacities for climate change adaptation and disaster risk management for sustainable livelihoods in agriculture sector. Project findings and recommendations, Terminal report (UNJP/071/UNJ). The Food and Agriculture Organization of the United Nations. https://un.info.np/Net/NeoDocs/View/994 [Accessed 05 July 2020]
Others	

29. Groundwater Resilience to CC and abstraction in Indo-Gangetic basin

Project Name	Groundwater Resilience to CC and abstraction in Indo-Gangetic basin
Funding Organizations and Fund	DFID £0.56 ml
Implementing body, collaborators, Led by?	ISSET Nepal
Project Duration	07.2012-09.2014
Project/Research component (Goal, objectives)	Provide an authoritative overview assessment of the occurrence and status of groundwater resources in the Indo-Gangetic Basin and to strengthen the evidence base linking groundwater, climate, population, and abstraction—collecting and systemizing existing data for policy and national planning and future research programs
Thematic coverage	Water, Research and technology extension (Climate information)
CC adaptation/support type	RKM,
Project geographic cover in Nepal	Nepal, regional
Outputs/ Outcomes (Generated services)	Evaluation of groundwater resources; Supported in locating and accessing available groundwater data sets across Nepal; Collection and evaluation of groundwater data nationwide; Provided support in developing a literature review and conduct a case study examining groundwater use and storage in the Himalayan mountains
Success story (points)	Development of a series of new maps for the IGB aquifer, building on existing datasets held in Pakistan, India, Nepal and Bangladesh, a review of approximately 500 reports and papers, and three targeted field studies on under-researched topics within the region
Lessons learned	Groundwater is more vulnerable to abstraction than climate change; Declining groundwater levels can have devastating impacts on aquatic ecosystems and significantly reduce access to groundwater; There is considerable variation in the nature of the aquifer, recharge and quality of groundwater across the IGB aquifer; Degradation of groundwater quality is a greater concern than depletion; Deep groundwater in the Bengal Basin is a vital source of good quality groundwater in a context where shallow water is contaminated by arsenic; High rates of abstraction have resulted in local depletion in some cities with groundwater levels falling rapidly (>100 m depth in some locations)

Challenges	Increase in salinity driven by irrigation and abstraction, and the contamination of groundwater from both agriculture and industry, pose bigger degradation threats than aquifer depletion Widespread contamination from both sewerage and industrial pollutants has degraded shallow ground waters
Way forward	Given the finite nature of groundwater resource, its continued use for drinking water should be carefully monitored and managed Attempts to save water should focus on reductions in non-beneficial consumption; Maintaining good quality groundwater supply in the largest cities will become more difficult over time unless steps are taken to address degradation threats within cities, and develop protected urban well fields beyond them; Continued exploration, testing and monitoring of shallow and deeper groundwaters across the aquifer system is needed to enable timely management systems to be developed to identify and mitigate further degradation
Source/reference	MacDonald AM, Bonsor HC, Taylor R, Shamsudduha M, Burgess WG, Ahmed KM, Mukherjee A, Zahid A, Lapworth D, Gopal K, Rao MS, Moench M, Bricker SH, Yadav SK, Satyal Y, Smith L, Dixit A, Bell R, van Steenbergen F, Basharat M, Gohar MS, Tucker J, Calow RC and Maurice L. 2015. Groundwater resources in the Indo-Gangetic Basin: resilience to climate change and abstraction. British Geological Survey Open Report, OR/15/047, 63pp. https://www.i-s-e-t.org/resource-nepal-groundwater [Accessed 06 July 2020] https://www.bgs.ac.uk/research/groundwater/international/SEAsiaGroundwater/home.html [Accessed 06 July 2020]
Others	

30. Hariyo Ban Program Phase I

Project Name	Hariyo Ban Program Phase I
Funding Organizations and Fund	USAID Budget: USD \$ 30 ml
Implementing body, collaborators	WWF, CARE, NTNC, and FECOFUN
Project Duration	2011 - 2016
Research component (Goal, objectives)	<ul style="list-style-type: none"> • reduce threats to biodiversity in targeted landscapes • build the structures, capacity, and operations necessary for effective sustainable landscape management, with a focus on REDD+ readiness • increase the ability of targeted human and ecological communities to adapt to the adverse impacts of climate change
Thematic coverage	For & Wm, DRR, GESI (Livelihoods), Research
CC adaptation support type	CbA, EbA???, CRDP, RKM
Project geographic cover in Nepal	Fifteen districts in TAL and CHAL landscapes: Dadeldhura, Kanchanpur, Kailali, Bardia, Banke, Dang, Nawalparasi, Chitwan, Kaski, Tanahun, Syangja, Manang, Mustang, Lamjung and Gorkha
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> • 18392 people training in CC adaptation strategies • 421 adaptation plans prepared. Under these plans the following major support provided: 359 drinking water system, 159 irrigation canal, 85 miles foot trails, 81 wildlife waterholes, installed/maintained; 414 checkdams, dykes and embankments constructed • 14 critical sub-watershed management plants implemented • 18831 persons trained in CCA, • 395331 persons benefitted though increased awareness and capacity and/or participated in adaptation activities, • 367407 people engaged in awareness raising training/capacity built on CC adaptation activities
Success story (points)	<ul style="list-style-type: none"> * Increased number of critical species such as tiger, rhino, snow leopard * successful to implement ecosystem based adaptation * Differential Impact Assessment and Response Planning (DIA-RP) framework should be adopted to identify the impacts, underlying causes and adaptation planning at local level. * Communities are integrating Community Adaptation Plans of Action (CAPAs) and Local Adaptation Plans of Action (LAPAs) with local resource management plans.

Lessons learned	<ul style="list-style-type: none"> * The impact level among different sub-groups are different in the same communities. People with disability, elderly, socially excluded groups seems most vulnerable. We should consider these issues while developing adaptation plans at local level. * Holistic river basin management is essential for landscape conservation, working at multiple levels * Long-term climate impacts on biodiversity and forestry are still poorly understood and climate change is a major advancing threat for both people and nature * Integration and harmonization of CCA and DRR policy and practice shows much promise and should be supported
Challenges	<ul style="list-style-type: none"> * NRM groups rich in resources tend to not adopt good governance practices, unlike resource-poor groups * Local level adaptation is often not enough to address broader ecosystem processes; more experience is needed in adaptation at higher levels
Way-forward	<ul style="list-style-type: none"> • There are excellent opportunities for PES for long-term financing of biodiversity conservation in Nepal, but it takes a long time and simple approaches are better • The policy development and approval process took much longer than planned, limiting Hariyo Ban I's time to support implementation of new policies • Integration and harmonization of CCA and DRR policy and practice shows much promise and should be supported • Local level adaptation is often not enough to address broader ecosystem processes; more experience is needed in adaptation at higher levels • There has been a very strong response to the green recovery work but it takes time to go from theory to practice; this work should be continued across sectors in order to maintain momentum
Source/References	<p>Leal Filho W, Barbir J, Preziosi R, editors. Handbook of Climate Change and Biodiversity. Springer; 2019.</p> <p>WWF 2017. Fact Sheet of Hariyo Ban 1.</p> <p>Jamarkattel BK, Dhakal S, Joshi J, Gautam DR and Hamal SS. Responding to Differential Impacts. Lessons from Hariyo Ban Program Nepal. CARE Nepal, Kathmandu</p> <p>ECODIT LLC 2015. Mid-Term Performance Evaluation of the Hariyo Ban Project. Task Order No. AID-367-TO-15-00001.</p> <p>https://www.worldwildlife.org/magazine/issues/spring-2017/articles/adapting-to-climate-change-in-nepal</p>

31. Hariyo Ban Program Phase II

Project Name	Hariyo Ban Program Phase II
Funding Organizations and Fund	USAID Budget: USD \$ 18 ml
Implementing body, collaborators,	WWF, CARE, NTNC, FECOFUN
Project Duration	2016 to 2021
Research component (Goal, objectives)	<ul style="list-style-type: none"> • mainstreaming of CAPAs and LAPAs in regular development planning process • support to implement existing CAPAs and LAPAs in selected sites that were developed in Phase I • introduction of time and energy saving technologies for agriculture and domestic use • integration of LAPAs and Local Disaster Risk Management Plans (LDRMPs)
Thematic coverage	For & Wm, GESI (Livelihood), DRR, Research
CC adaptation support type	CbA, EbA???, CRDP, RKM
Project geographic cover in Nepal	Fifteen districts in TAL and CHAL landscapes: Dadeldhura, Kanchanpur, Kailali, Bardia, Banke, Dang, Nawalparasi, Chitwan, Kaski, Tanahun, Syangja, Manang, Mustang, Lamjung and Gorkha
Outputs/ Outcomes (Generated services)- Expected	<ul style="list-style-type: none"> • Over 100,000 stakeholders will have increased capacity to adapt climate change • 150,000 people will participate in climate change adaptation activities • Over 11,000 people will get training on climate change adaptation
Success story (points)	
Lessons learned	
Challenges	
Way-forward	
Source/References	

32. Himalayan Adaptation, Water and Resilience (HI-AWARE)

Project Name	Himalayan Adaptation, Water and Resilience (HI-AWARE) Research on Glacier and Snowpack Dependent River Basins for Improving Livelihoods
Funding Organizations and Fund	DFID, IDRC, CARIAA Budget
Implementing body, collaborators	ICIMOD
Project Duration	2014-2019
Project/Research component (Goal, objectives)	Contribute to enhanced climate resilience and adaptive capacities of the poor and vulnerable women, men, and children living in these river basins by leveraging research and pilot outcomes to influence policy and practice to improve their livelihoods
Thematic coverage	DRR, Water & Energy, Research
CC adaptation/support type	RKM
Project geographic cover in Nepal	Langtang and Nuwakot and the Gandaki floodplain in Nepal
Outputs/ Outcomes (Generated services)	Research on biophysical drivers and conditions that lead to people's being vulnerable to climate change Research on socio-economic, governance and gender drivers and conditions leading to vulnerability to climate change Monitoring and assessing climate change adaptation practices Building the capacity of MSc/PhD students, research institutes and NGOs from the region for conducting interdisciplinary research on climate change vulnerability, adaptation and resilience
Success story (points)	Critical adaptation moments; Adaptation turning points Adaptation pathways; Testing adaptation measures in these sites and designing adaptation pathways for out-scaling and up-scaling
Lessons learned	Conducting interdisciplinary research on climate change vulnerability, adaptation and resilience involving researchers, research institutes and NGOs
Challenges	Weak institutional collaboration among different stakeholders Out-scaling and up-scaling of adaptation measures and adaptation pathways
Way forward	Science-Policy Dialogue bringing together key stakeholders including researchers and policymakers, working on climate change adaptation; Gender sensitive training sessions and climate change vulnerability and adaptation workshops
Source/reference	https://www.icimod.org/initiative/about-hi-aware/ [Accessed 04 July 2020] http://hi-aware.org/ [Accessed 04 July 2020]
Others	

33. High Mountains Adaptation Partnership (HiMAP)

Project Name	High Mountains Adaptation Partnership (HiMAP)
Funding Organizations and Fund	USAID Climate Change Resilient Development (CCRD) Budget ??????
Implementing body, collaborators	TMI, University of Texas, Austin
Project Duration	03.2012 – 06.2015
Project/Research component (Goal, objectives)	Strengthen the scientific, social and institutional capacity for climate change adaptation and resilient development, as well as disaster risk mitigation and management for potentially dangerous glacial lakes and other climate-related disasters in Nepal
Thematic coverage	DRR
CC adaptation/support type	CbA, CRDP
Project geographic cover in Nepal	Solukhumbu district, Chaurikharka, Namche and Khumjung
Outputs/ Outcomes (Generated services)	HiMAP facilitated the development of a local adaptation plan of action, or LAPA for Khumbu region; 5 major community consultations, 6 field surveys at Imja glacial lake; HiMAP developed Glacier Lake Rapid Reconnaissance (GLRR) method for the study of glacial lakes; Khumbu LAPA – a result of extensive consultations, meetings, and workshops involving over 300 participants from a wide range of stakeholder groups over a two-year period
Success story (points)	Khumbu LAPA represents a major step in the ability of local people in the region to understand, evaluate, and adapt to the impacts of climate change on their high mountain environments and lifestyles
Lessons learned	<ul style="list-style-type: none"> * Establish trust and relationships * Integrate development objectives into LAPA * Include marginalized groups in the LAPA * Conduct assessment and incorporate scientific knowledge in LAPA process * Build partnerships to maximize synergy
Challenges	Working in remote areas – develop assessments of logistics, cultures, economies, and leadership issues prior to community consultation; Access to remote areas can be highly dependent on climate conditions e.g. increasing cloudy days have resulted in regular flight cancellations and travel delays; Additional challenges such as extreme poverty, comparative remoteness, lack of airports, and outmigration of young men to other countries, changes in village demographic structure
Way forward	Integrated, interdisciplinary approaches to glacial lake assessment and mitigation will be needed to realistically address future conditions – reconnaissance and lake selection, field science and engineering, local climate awareness, adaptation and resilience, economic impacts and infrastructure opportunity, environmental impacts and conservation
Source/reference	https://dec.usaid.gov/dec/content/Detail.aspx?VID=47&ctID=ODVhZjk4NWQzM2YyMiooYjRmLTkxNjktZTcxMjM2NDBmY2Uy&rID=MjAzMjU4 [Accessed 06 July 2020]
Others	

34. Integrating Agriculture in National Adaptation Plans (NAP-Ag)

Project Name	Integrating Agriculture in National Adaptation Plans (NAP-Ag)
Funding Organizations and Fund	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUB), Budget: US \$ 0.7 ml
Implementing body, collaborators	UNDP, FAO, and MoAD
Project Duration	2016 – 2018
Research component (Goal, objectives)	Institutional and technical capacity for CCA and disaster risk management in agriculture, assessing and monitoring of climate risks, vulnerabilities, improving knowledge management, reducing climate related risks by adopting technical ag and livestock related options and strengthening preparedness capacity for disaster risks
Thematic coverage	Ag &Fs
CC adaptation support type	CSA, CRDP
Project geographic cover in Nepal	Three watersheds (Mugu, Dailekh and Bardia)

Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> • Conducted climate change vulnerability/risk assessments and a Cost Benefit Analysis (CBA) of Climate Change Adaptation (CCA) measures in agriculture and livestock to inform CCA planning and budgeting. • Developed a Strategic Investment Framework (SIF) for agro-ecological based climate adaptation measures in three watersheds (Mugu Karnali, Lohare and Babai) covering Mountain, Hill and Terai ecological zones to inform future proposals to the Green Climate Fund. • Formulating recommendations to enhance the classification, coding, and expenditure tracking of the agricultural sector budget align to national climate objectives. Facilitating a dedicated task force constituted within MoALMC with training and policy advisory support. • Established a National Project Management Unit (NPMU) to guide and oversee all activities and formed a Project Steering Committee (PSC) and Project Technical Taskforce (PTT) Chaired by the MoALMC. Regular meetings of the PSC and PTT have provided operational and technical backstopping to support the national NAP process and to integrate project outputs and learning in the forthcoming NAP. • Developing internal guidelines and coordination mechanisms for improving planning and budgeting processes for mainstreaming climate adaptation measures, including at sub-national level. • Collaborated with relevant initiatives such as GCF-Readiness Project, Public Expenditure Tracking Survey and a collaborative research project at the Ministry of Finance and GEF-Climate Change Adaptation Project at MoALMC. • A budgeting taskforce formed under MoALMC is classifying climate relevant activities of the ADS and supporting new federal, province and sub-national level guidelines to better capture climate spending. • Supported government staff (#4) to participate in global and regional trainings, forums, dialogues on climate change adaptation. Disseminated relevant knowledge products to stakeholders, including supplementary guidelines on “Addressing agriculture, forestry and fisheries” and briefs. • Nepal focus of country-level Mid Term Review for entire NAP-Ag project
Success story (points)	<p>* NAP-Ag has significantly raised the profile of addressing adaptation options for agriculture, in ongoing NAPs processes as well as other climate change strategic frameworks, and contributes to the implementation of NDCs.</p> <p>*This programme has been providing active support to the ongoing NAP process under the Agriculture and Food Security theme. Based on an assessment of gaps and entry points to improve climate budgeting in agriculture-related ministries, new systems for expenditure classification and tracking were endorsed</p> <p>*This programme has been undertaking a review of existing agricultural M&E systems to identify options to link the M&E systems of the Nepal Agricultural Development Strategy and targets related to climate resilience with the food security and nutrition theme of Nepal’s NAP.</p>
Lessons learned	<p>* Technical assistance including policy advocacy can help the government initiate the NAPs process</p> <p>* Improving existing coordination mechanisms creates synergies among different adaptation actions.</p> <p>* There are climate finance gaps in the development of climate resilient agriculture, enhancing</p>
Challenges	Still some gaps exist in professional level climate change knowledge and monitoring and evaluation framework

Way-forward	<p>*The Programme will support the development of profession specific guidelines for decision makers on how to integrate climate change into agriculture planning and budgeting processes.</p> <p>*These guidelines will be provided in parallel with training workshops for different governmental entities. In addition, the Programme will finalize a review of the sectoral M&E framework and identify ways to link the targets of the Nepal Agricultural Development Strategy to the climate resilience to the food security and nutrition theme of Nepal's NAP.</p>
Source/References	<p>UNDP 2016. Fact sheet of Integrating Agriculture in National Adaptation Plans NAP-Ag.</p> <p>UNDP/FAO undated. Integrating Agriculture in National Adaptation Plans (NAP-Ag) Programme. Programme highlights 2015–2018.</p>

35. Initiative for Climate Change Adaptation (ICCA) Project

Project Name	Initiative for Climate Change Adaptation (ICCA) Project
Funding Organizations and Fund	USAID, Budget US \$ 2 ml
Implementing body, collaborators, Led by?	IDE, Rupantaran and RIMS
Project Duration	03.2012-03.2017
Research component (Goal, objectives)	Increase resilience of poor and vulnerable communities by helping them adapt to, and mitigate the adverse impacts of climate change in Nepal Strengthen the Government of Nepal's capacity to develop and implement policies related to climate change adaptation.
Thematic coverage	Ag & Fs, For & Wm; GESI (Governance)
CC adaptation support type	CbA
Project geographic cover in Nepal	Nawalparasi, Rupandehi, Kapilbastu, Dang, Rolpa, Syangja, Kaski, and Parbat
Outputs/ Outcomes (Generated services)	* Reached 19,625 households with training and material support * Supported 19 DUs * Facilitated preparation of 48 LAPAs * Installed 881 improved cook stoves * Established and supported 12 Community Climate Resource Centers
Success story (points)	Low cost ponds and other water efficient technologies contributed to increase income of vulnerable households Development of safety net packages and IPM Scaling up of NTFP/essential oil enterprises/high value vegetables
Lessons learned	Resilience of poor and vulnerable communities must be enhanced to adapt and mitigate the adverse impacts of climate change in Nepal
Challenges	Resilience of poor and vulnerable communities
Way Forward	Extension of models and integration in other climate change adaptation programmes
Others	
Source/reference	https://www.usaid.gov/sites/default/files/documents/1861/SEED%20-%20ICCA.pdf https://amis.mof.gov.np/home?p_p_id=topdonorhome_WAR_AMPportlet&p_p_lifecycle=0&p_p_state=maximized&p_p_mode=view&p_p_col_id=column-1&p_p_col_pos=3&p_p_col_count=4&_topdonorhome_WAR_AMPportlet_activityId=9263&_topdonorhome_WAR_AMPportlet_render=activityDetails [Accessed 14 July 2020]

36. Multi Stakeholder Forestry Programme (MSFP) -Enhancing Resilience of Vulnerable Communities to Climate Change

Project Name	Multi Stakeholder Forestry Programme (MSFP) -Enhancing Resilience of Vulnerable Communities to Climate Change
Funding Organizations and Fund	DFID, SDC, Finland Budget: US\$ 72 ml
Implementing body, collaborators	MoFSC, RRN, ECARDS, RIMS, LIBIRD, Rupantaran, IDS and ENPRED
Project Duration	2011 - 2016
Research component (Goal, objectives)	The following indicators considered as critical for inclusive climate resilience: i) improving the sustainability of the forest ecosystem; ii) improving the sustainable use and management of the forest products and services; iii) ensuring equitable access to forest resources and services; iv) expanding community management systems and ensuring tenure security; v) ensuring an enabling policy and regulatory environment for implementing climate resilient programmes
Thematic coverage	For & Wm, Water & Energy, and GESI (Governance)
CC adaptation support type	CbA, EbA, CRDP
Project geographic cover in Nepal	Terathum, Dhankuta, Bhojpur, Sankhuwasawa, Okhaldhunga, Khotang, Ramechhap, Parbat, Myagdi, Baglung, Nawalparasi, Kapilbastu, Rupendhi, Salyan, Puthan, Dang, Rukum, Rolpa, Kalikot, Jajarkot, Dailekh, Bajhang, Achham
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> •17,843 HHs have been sensitized on climate induced disaster; •Vulnerability mapping of about 68,600 HHs of 2,529 vulnerable communities; •In total, 2,529 adaptation plans (LAPAs and CAPAs) prepared; •369 LAPAs and 1,591 CAPAs implemented; •A total of 239,617 HHs have benefited
Success story (points)	<ul style="list-style-type: none"> * Awareness raising and sensitization on the climate change issues at local level * Created interests among different other projects and stakeholders
Lessons learned	<ul style="list-style-type: none"> * Both LAPA and CAPA are very useful for increasing ownership, leveraging and managing resources. * CAPA plans seem more realistic and chances are very high to be implemented without external support. * Successful implementation of adaptation plans requires holistic, participatory, and multi-stakeholder approaches and multi-sectorial support
Challenges	<ul style="list-style-type: none"> * Difficulty working with multiple implementing agencies *Weak technical know-how *Resource leverage and institutional capacity *Recognition and sustainability
Way-forward	<ul style="list-style-type: none"> * Policy Intervention: Current policy need to recognize the ownership roles of the vulnerable communities in CAPA process * Capacitate local human resources and local institutions * Cross-sectoral collaboration and Integrate traditional knowledge and Recognize local resources
Sources/References	MSFP 2016. Enhancing Resilience of Vulnerable Communities to Climate Change. MSFP experiences and lessons learnt. IOD/PARK 2015. Mid term Report of Nepal Multi-stakeholder Forestry Programme. Final Report submitted to Ministry of Forests and Soil Conservation, Singh Durbar, Kathmandu

37. Nepal Climate Change Support Programme (NCCSP) I

Project Name	Nepal Climate Change Support Programme (NCCSP) I
Funding Organizations and Fund	DFID and EU Budget: DFID: 10 ml, EU € 8.6 m
Implementing body, collaborators	UNDP, MoSTE, MoFE, MoFAGA and AEPC
Project Duration	2013 - 2017
Research component (Goal, objectives)	Promoting community based adaptation through integrated management of agriculture, water, forest and biodiversity sectors Aimed at ensuring the poorest and most vulnerable communities in Nepal are able to adapt to the effects of climate change.
Thematic coverage	Ag & Fs, For & Wm, Energy, DRR, GESI (Governance), Health
CC adaptation support type	CbA, CSA, CRDP
Project geographic cover in Nepal	Humla, Mugu, Dolpa, Jumla, Kalikot, Dailekh, Jajarkot, Rolpa, Rukum, Dang, Bardiya, Kailali, Bajura, Achham
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> • The capacity of relevant institutions at national and local levels to support the design, • Local and sub-regional level mechanisms are put in place to test and promote scalable initiatives for climate adaptation and resilience • Awareness raised on climate change and what can be done to increase resilience to have reached 50 000 people • 100 LAPAs have been prepared across 14 districts. • By Feb. 2015, more than 715 adaptation actions have been completed • LAPA actions have been incorporated and budgeted in the annual planning • 615,000 climate vulnerable people have been benefited from the programme. • Overall, it is estimated that at least 250 000 people have received direct or indirect benefits from the programme.

Success story (points)	<ul style="list-style-type: none"> * An independent documentation of case studies reveals that the programme was successful in building climate resilience of local communities with enhanced coping capacity to recover from climate related shocks and stresses. * The programme promoted climate resilient farming, diversified income sources to increase coping capacity, * In addition, the programme constructed climate smart infrastructure, and successfully identified and targeted women and climate vulnerable people. * Strengthening of GoN's institutional and financial mechanisms to support adaptation. * NCCSP was a good learning project in terms of integrating and taking climate actions at the local level * The riverbank farming has immensely benefitted the households involved in the farming, and their income has increased by 35 thousand to 40 thousand rupees per annum. * Clean Water is helpful for the healthy life in Chhipra VDC Humla
Lessons learned	<ul style="list-style-type: none"> * Climate adaptation programmes are new in Nepal, so that systems and approaches are still being developed and tested. * Flexibility and capacity building are key for the services to be effectively delivered. * The LAPA framework needs revision to support integration with disaster management plans as well as district and village development plans. * The project activities need to be institutionalized at local level. This project institutionalized local Coordination Committees at district, village and municipal levels to mainstream climate change adaptation agenda into local development plans. * Ownership is the key for the programme success. For this use of government systems played a key role in implementing adaptation programme across a wide geographic area. Government's ownership of NCCSP helps to mainstream climate change into local planning process.
Challenges	<ul style="list-style-type: none"> * Some adaptation measures are beyond the scope of community projects. Generally speaking, the LAPA process could successfully be integrated into local government planning. * CC needs to explicitly monitor is the impact of migration on communities receiving adaptation support, and whether migration support is a cost-effective adaptation option.
Way-forward	<ul style="list-style-type: none"> * Good practices in programme implementation will be identified and suggestions for improvement for effective LAPA implementation will be formulated. * A special focus should be given to the establishment of local funds for climate change adaptation. * Further efforts should be made to support the transfer of appropriate technologies to the communities, to change the adaptation capacities of the vulnerable households. This could be done in partnership with national and International agencies and entities from the private sector. * More systematic communication on climate change issues is needed at local level, facilitating the implementation of Climate Change policies including NAPAs and LAPAs.

Source/References	<p>Maharjan SK 2019. Stocktaking of local adaptation plans and initiatives in the changing political context in Nepal. Environment, Development and Sustainability.:1-9.</p> <p>NCCSP 2017. Nepal Climate Change Support Programme (NCCSP) Annual Progress Report 2017.</p> <p>GCCA undated. https://www.gcca.eu/programmes/nepal-climate-change-support-programme-nccsp-building-climate-resilience</p> <p>MoPE/NCCSP. (2016). Success Stories on Adaptation from the field.</p> <p>Government of Nepal. Ministry of Population and Environment, Kathmandu, Nepal.</p>
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Nepal Climate Change Support Programme (NCCSP) Transition Project Name	Nepal Climate Change Support Programme (NCCSP) Transition
Funding Organizations and Fund	DFID Budget: DFID (US \$ 2.67 ml)
Implementing body, collaborators	MoFE, MoSTE, MoFAGA, AEPC
Project Duration	October 2018 to October 2019
Research component (Goal, objectives)	Climate Resilient Development Projects implemented, enhanced capacity of local bodies on Climate Resilient Development Planning, implementation process, fiduciary risk management and social accountability, and Learning and evidences documented to support and inform Nepal's initiative on climate resiliency including climate change policy, climate adaptation framework, strategy, guidelines to support planning, and implementation of climate resilient development activities
Thematic coverage	Ag & Fs, For & Wm, Energy, DRR, GESI (Governance), Health
CC adaptation support type	CbA, CSA, CRDP
Project geographic cover in Nepal	Humla, Mugu, Dolpa, Jumla, Kalikot, Dailekh, Jajarkot, Rolpa, Rukum, Dang, Bardiya, Kailali, Bajura, Achham
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> • Implemented 78 CRDPs enhancing climate resiliency and sustainability of implemented projects. These projects have been benefitting 84,443 people. • Created 86,419 person days of employment benefitting 4,189 locals through CRDPs • Implemented 33 integrated irrigation schemes constructing 6,176 meters of irrigation canal and irrigation ponds with the capacity of 1,887 cubic meter that irrigate 1,433 ha of arable land. These irrigation schemes have benefitted 5,775 households in enhancing their adaptive capacity towards drought and contributing towards food security and livelihoods. • Improved access to drinking water for 1,752 Households through 16 drinking water schemes with 31 reservoir tanks of 326 cubic meter capacity. • The clean drinking water is distributed through 304 public and private tap stands. • Constructed gabion structure of 5,237 m³ for the protection of 450-hectare area of land and settlements, benefitting 3,055 households. • Protection of 1-Hectare area of wetland through construction of two recharge ponds with capacity of 5,473 cubic meter • Constructed two disabled friendly flood resilient community shelters which can provide shelter to 850 people during the floods • Maintenance of Khatikhola Micro Hydro Project of capacity 80KW benefitting 732 Households
Success story (points)	<p>*The 157 households (958 local people-485 male and 473 female) of the local communities have benefitted.</p> <p>* Protection of 305 hectare area of land through the construction of gabion structure of 2060 m³ benefitting 922 households (4991</p>

Lessons learned	<ul style="list-style-type: none"> * Local governments need intensive engagement/support for mainstreaming climate resilience in their plans. Detailed capacity development plan should be prepared for the local government and the TA team should be embedded in local government office and frontloaded for capacity development. * Integrated irrigation and drinking water related projects are dominant and are of communities' priority. Thus, capacity development, technology advancement, engineering, and budgeting support should be focused on these areas. * Achieving effective climate change adaptation also requires institutional strengthening at federal, provincial and local government levels, based on the principle of cooperation, coordination, and coexistence that support climate-resilient development.
Challenges	<ul style="list-style-type: none"> * Transaction cost is higher by 3 to 4 times in remote areas as compared to urban accessible areas. Therefore, there should be a provision of additional budget for remote areas.
Way-forward	<ul style="list-style-type: none"> * Design a pilot/model project (LAPA/CRDP) at local level for wider demonstration, * Future projects need to consider for thorough planning for scaling up and scaling out approach in future programme, and * Design climate resilient projects addressing the multiplier effect of climate change.
Source/References	Ministry of Forests and Environment, Nepal Climate Change Support Programme, 2019. Building Climate Resilient Communities: Project Completion Report, pp.24

38. Nepal Climate Change Support Programme (NCCSP) II

Project Name	Nepal Climate Change Support Programme (NCCSP) II
Funding Organizations and Fund	DFID, UNDP, EU Budget:
Implementing body, collaborators	MoFE, MoSTE, MoFAGA, AEPC, Mott MacDonald
Project Duration	02.2019-07.2023
Research component (Goal, objectives)	Climate Resilient Development Projects implemented, enhanced capacity of local bodies on Climate Resilient Development Planning, implementation process, fiduciary risk management and social accountability, and Learning and evidences documented to support and inform Nepal's initiative on climate resiliency including climate change policy, climate adaptation framework, strategy, guidelines to support planning, and implementation of climate resilient development activities
Thematic coverage	Ag & Fs, For & Wm, DRR, Energy, DRR, GESI, Health, Governance
CC adaptation support type	CbA, CSA, CRDP
Project geographic cover in Nepal	Humla, Mugu, Dolpa, Jumla, Kalikot, Dailekh, Jajarkot, Rolpa, Rukum, Dang, Bardiya, Kailali, Bajura, Achham
Outputs/ Outcomes (Generated services)	<ul style="list-style-type: none"> • 151 feasible LAPAs identified that will support 59,509 indirect beneficiaries and 84,864 direct beneficiaries. • 19 LAPAs under implementation mostly related with drinking water, small-scale irrigation, landslide protection and livelihoods with direct response to COVID-19 for fiscal year 2019/20 (2076/77). • To date, the total capital costs committed is £3.2 million, including £1.6m from NCCSP2/UKAID (50%), £1.2m from municipalities (38%), £313k from community (9%) and £98k from other matching funds (3%). • 26 climate-induced hazard atlases produced for targeted municipalities covering landslides, floods, forest fires and droughts to support evidenced-based planning and decision-making • Delivered 51 training workshops in different areas of climate resilient planning, engineering design and implementation reaching 699 municipality staffs
Success story (points)	<ul style="list-style-type: none"> • Climate Risk Index to identify and prioritise the most at risk and vulnerable municipalities and to determine the allocation of climate finance to each municipality.
Lessons learned	<ul style="list-style-type: none"> * Municipalities need to follow inclusive decision-making and use evidence of hazards, climate change, and socio-economic data. * value for money <p>Social facilitation from Municipalities supported by TA is needed for continuous functioning of User Committees.</p>
Challenges	
Way-forward	
Source/References	

39. NCCKMC

Project Name	NCCKMC
Funding Organizations and Fund	DANIDA, DFID-UK, GEF, UNDP Budget:
Implementing body, collaborators, Led by?	NAST, MoSTE
Project Duration	2009-2010
Project/Research component (Goal, objectives)	To serve as a dedicated institutional arrangement for managing climate change knowledge in Nepal To serve as a platform for coordinating and facilitating the regular generation, management, exchange and dissemination of climate-related knowledge and capacity building services to a multi-stakeholder climate change community of practice in Nepal
Thematic coverage	Research
CC adaptation/support type	RKM
Project geographic cover in Nepal	Nepal
Outputs/ Outcomes (Generated services)	Collection of >1800 books, journals and reports; Publication of books and newsletters; Mobile library campaigns for climate change awareness and climate change risk management in >40 districts
Success story (points)	Interaction with young climate researchers; >60 schools and local clubs/library got actively involved and >12000 people mainly the school children and teachers benefitted from mobile library programme; National and international researchers visited the centre
Lessons learned	Strong and effective knowledge management centre that ensures the production and dissemination of climate change knowledge information in the country, strengthen the capacity of various stakeholders by providing them with the required information is key to respond to challenges posed by climate change
Challenges	Center sustainability and strengthening
Way forward	Climate Change Knowledge and Research Grant Management, in partnership with Asian Development Bank (ADB); Strengthening NCCKMC Project, in coordination with Climate and Development Knowledge Network (CDKN); Development and dissemination of climate risk management toolkits and IEC materials for national and sub national stakeholders (CC/DRM focal points), media and communities including students, in coordination with United Nations Development Program (UNDP); Establishment of NCCKMC in partnership with Ministry of Environment (the Then) as an expanded program of National Adaptation Program of Action (NAPA)
Source/reference	NAST. 2010. Nepal Climate Change Knowledge Management Center, Final Report. Nepal Academy of Science and Technology, Khumaltar, Lalitpur
Others	

40. Promoting Inclusive Governance and Resilience for Right to Food (SAMARTHYA)

Project Name	Promoting Inclusive Governance and Resilience for Right to Food (SAMARTHYA)
Funding Organizations and Fund	Care Denmark
Implementing body, collaborators,	National Farmers Groups Federation (NFGF), National Land Right Forum (NLRF)/LiBIRD Budget ?????
Project Duration	2018-2021
Research component (Goal, objectives)	Representative people's organisations have individually and in alliances or networks contributed to the realization of the right to food for the benefit of the impact groups in partnership with local and state governments.
Thematic coverage	Ag & Fs, GESI (Governance, Livelihood)
CC adaptation support type	CbA, CSA
Project geographic cover in Nepal	Siraha, Udayapur and Okhaldhunga
Outputs/ Outcomes (Generated services)- Expected	<ul style="list-style-type: none"> • The project has designed agro-advisory, climate-resilient crop variety seeds, and integrated land and watershed resource management models for demonstrations and future scaling out. • In 2018/19, the project has reached out to 399 households including 295 women-headed households from 19 farmers' groups.
Success story (points)	* Lease-based farming for improving livelihoods of Musahar families at Belaka Municipality in Udayapur district
Lessons learned	* Strong government support is essential for sustainability and scaling up of all activities to achieve impacts beyond the programme's duration.
Challenges	<p>* Some adaptation measures are beyond the scope of community projects. Generally speaking, the LAPA process could successfully be integrated into local government planning.</p> <p>* CC needs to explicitly monitor is the impact of migration on communities receiving adaptation support, and whether migration support is a cost-effective adaptation option.</p>
Way-forward	
Source/References	LI-BIRD. 2019. Annual Report 2018-19. Pokhara, Nepal: LI-BIRD.

41. Reducing vulnerability and increasing adaptive capacity to respond the impacts of climate change and variability for sustainable livelihood in agriculture sector

Project Name	Reducing vulnerability and increasing adaptive capacity to respond the impacts of climate change and variability for sustainable livelihood in agriculture sector
Funding Organizations and Fund	LDCF/GEF Budget US \$2.68
Implementing body, collaborators, Led by?	FAO, MoAD, MoLD
Project Duration	09.2015 – 08.2019
Research component (Goal, objectives)	Increase technical and institutional capacities in agriculture and livestock sector promote transfer and adoption of sustainable, climate-resilient and environment-friendly agriculture practices and technologies.
Thematic coverage	Ag &Fs,
CC adaptation support type	CbA, CSA
Project geographic cover in Nepal	Arghakhanchi, Kapilbastu, Siraha, Udayapur
Outputs/ Outcomes (Generated services)	Increased household income Stabilized terrace and controlled soil erosion
Success story (points)	Off-season vegetable farming (changed the crop calendar) in order to offset the CC impacts. Climate smart agriculture practices are beneficial in local livelihood.
Lessons learned	Increasing participation of all the stakeholders including local communities, policy makers and business results would result in better outcomes of the project Anticipation of environmental variables in project areas is important in smooth implementation of project interventions.
Challenges	Low level of participation of local communities Policy recommendations not adopted by policy makers Non-synchronization of co-financing projects
Way forward	Learning-by-doing strategy will help strengthen community mobilization and participation Engaging stakeholders including policy makers in update of policies and strategies In-depth analysis of co-financing projects and baseline interventions will be helpful
Others	
Source/reference	http://www.fao.org/nepal/programmes-and-projects/success-stories/climate-change/en/ http://www.fao.org/nepal/news/detail/en/c/1116472/

42. Support to Rural Livelihoods and Climate Change Adaptation in the Himalayas-Himalica

Project Name	Support to Rural Livelihoods and Climate Change Adaptation in the Himalayas-Himalica
Funding Organizations and Fund	European Union (EU). Budget: EU 10 ml
Implementing body, collaborators,	ICIMOD, BCN, MoAD, NDRI
Project Duration	2013-2018
Research component (Goal, objectives)	Aimed at supporting poor and vulnerable mountain communities in the Hindu Kush Himalaya region in the context of socio-economic and climate change, and the conservation of ecosystem services, through active regional cooperation
Thematic coverage	For & Wm, Water, GESI (Livelihood)
CC adaptation support type	CbA, CSA, EbA
Project geographic cover in Nepal	Pakistan, Myanmar, Bangladesh, Bhutan, and Nepal
Outputs/ Outcomes (Generated services)- Expected	<ul style="list-style-type: none"> • Ensuring Flagship and new projects will yield long-term evidence and lessons • Extraction and sharing of knowledge and evidence • Building local capacity to replicate successful approaches • Informing local, national, and international adaptation plans and policies
Success story (points)	<p>* This project empowered local communities, particularly women, to diversify their income sources by forming the Kangchenjunga Himalica Agriculture Industry (KHAI), a community enterprise with 13 members, supported in producing, processing, and marketing vegetables and cardamom-based products. The KHAI generated almost USD 12,000 and invested to operate common facility centre in Taplejung.</p> <p>* The project initiated a business model to tackle the climate risks in the mountain regions.</p> <p>* Supported by ICIMOD's Himalica Initiative, Dumrithumka CFUG implemented sustainable land use management practices that have led to an increase in vegetation cover and reduced erosion. Two community forest user groups in neighbouring villages have replicated the model.</p>
Lessons learned	* Strong government support is essential for sustainability and scaling up of all activities to achieve impacts beyond the programme's duration.
Challenges	-
Way-forward	<p>*There is an opportunity to scale up this pilot business model in Nepal, Bhutan, and Northeast India through ICIMOD's Resilient Mountain Solutions and Kangchenjunga Landscape Initiatives.</p> <p>* Replication and scaling up of the sustainable land use management practices in other CFUGs in the mountain regions.</p> <p>*Make an effort to ensure integration between adaptation to climate change, disaster risk reduction, and sustainable development for the mountains through evidence-based decision making.</p> <p>*Build resilient, equitable, and inclusive mountain communities empowered by economic opportunity and investment in mountain infrastructure and connectivity.</p>
Source/References	ICIMOD 2019. Annual report of International Centre for Integrated Mountain Development (ICIMOD) 2018. https://www.icimod.org/initiative/about-himalica/

43. Scaling up Climate Resilient Agriculture for Sustainable Livelihood of Smallholder Farmers in Nepal (CRA)

Project Name	Scaling up Climate Resilient Agriculture for Sustainable Livelihood of Smallholder Farmers in Nepal (CRA)
Funding Organizations and Fund	Bread for the World – Protestant Development Service Budget ?????
Implementing body, collaborators	LI-BIRD
Project Duration	2018-2021
Project/Research component (Goal, objectives)	Diversify food and income sources of target groups, particularly for women-led and socially marginalized households Increase adaptive capacities and resilience of vulnerable communities to climate and disaster risks Contribute to create favourable policy environment for mainstreaming climate-resilient agriculture in government (national, federal and local) policies and plan
Thematic coverage	Ag & Fs
CC adaptation/support type	CbA, CSA
Project geographic cover in Nepal	Sindhupalchok (Tripurasundari, Sunkoshi and Lishanku Pakhar RM) and Kaski districts (Bhadaure Tamagi and Majhtana)
Outputs/ Outcomes (Generated services)	Smallholder farmers (farmers having <0.5 ha are categorized as smallholder households in Nepal) from marginalized households, particularly women and youths; The project aims to reach 1800 and 300 HHs in Sindhupalchok and Kaski districts respectively
Success story (points)	The majority of the directly targeted households are among the poor and disadvantaged communities; the interventions are planned to address the issues
Lessons learned	Low-external-input based practices rather than transfer and adoption of input-intensive technologies and practices for responding to climate change
Challenges	Increased temperatures, erratic precipitation, uncertain seasons and increased intensity and frequency of extreme weather events, is expected to exacerbate food security challenges by impacting food production, disrupting supply chains and raising food prices
Way forward	Adaptation and continual learning are essential
Source/reference	http://www.libird.org/app/projects/view.aspx?record_id=81 [Accessed 04 July 2020]
Others	

44. Scaling Up Climate Smart Agriculture in Nepal (CSA)

Project Name	Scaling Up Climate Smart Agriculture in Nepal (CSA)
Funding Organizations and Fund	CDKN Budget£ 0.55 ml
Implementing body, collaborators, Led by?	LI-BIRD in collaboration with CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)
Project Duration	2015-2017
Project/Research component (Goal, objectives)	Develop portfolios of targeted climate-smart agricultural technologies and practices for benefitting women and marginalized farmers of the three agro-ecological zones (terai, mid-hill, and high hill) of Nepal, develop CSA scaling up pathways and implementation plan, support government of Nepal by providing decision making tools for promoting CSA in Nepal
Thematic coverage	Ag & Fs, GESI (Livelihood)
CC adaptation/support type	CSA technologies and practices
Project geographic cover in Nepal	Nawalparasi, Kaski, Lamjung districts
Outputs/ Outcomes (Generated services)	A portfolio of champion CSA (technologies and practices) for various agro-ecological zones of Nepal; Assessment of Institutional and Policy status/scenario (Opportunities and barriers) for CSA scaling up in Nepal; Climate analogue sites (recommendation domain) of the identified CSA portfolio; CSA scaling up pathways and implementation plan for Nepal; Capacity of GoN stakeholders strengthened addressing skills and knowledge gaps on CSA planning and implementation
Success story (points)	Discussion on scaling-up CSA gained momentum; Policy discourse is underway on scaling-up CSA & CSV in Nepal. CSA criteria and indicators were developed.
Lessons learned	Strong backing of local stakeholders to adopt CSA practices and technologies to cope with and adapt to the challenges exacerbated by climate change
Challenges	Policy and institutional framework as the barriers for translating the favorable policy provisions into action; Constraints for resource leveraging from various sources for scaling up CSA
Way forward	Need to make usable knowledge readily accessible to the farming communities; Policies to be more sensitive to the needs of smallholder farmers and women who are the most vulnerable to the effects of climate change; Research is needed not only for the negative impact of climate change, but also the positive effects of climate change; Need to create incentives for private sectors, so that they can run sustainable business model for promoting CSAs
Source/reference	http://www.libird.org/app/news/view.aspx?record_id=44 [Accessed 04 July 2020] http://www.libird.org/app/news/view.aspx?record_id=46 [Accessed 04 July 2020] http://www.libird.org/app/news/view.aspx?record_id=47 [Accessed 04 July 2020] https://cdkn.org/wp-content/uploads/2017/06/Nepal-agriculture-synthesis-final444.pdf
Others	

45. Strengthening Civil Society Organization (CSO) and Community Response to Climate Change in Nepal (SCRC)

Project Name	Strengthening Civil Society Organization (CSO) and Community Response to Climate Change in Nepal (SCRC)
Funding Organizations and Fund	The Development Fund, Norway Budget ????
Implementing body, collaborators, Led by?	LI-BIRD
Project Duration	2014-2016
Project/Research component (Goal, objectives)	Goal – to increase the adaptive capacity of climate vulnerable groups of Nepal through proper climate policies at national and local level Policy advocacy and capacity building of civil society organizations on climate change and reducing vulnerability of climate vulnerable communities (CVC) Promotion and scaling up the community-based climate change adaptation technologies in the country
Thematic coverage	Awareness raising and capacity development, GESI
CC adaptation/support type	CbA
Project geographic cover in Nepal	Siraha, Okhaldhunga, Dhanusa, Mahottari, Bardiya, Jajarkot, Jumla, Kailali
Outputs/ Outcomes (Generated services)	brought together 125 NGOs working on climate change issues in Nepal, and a network of NGOs called NGONCC has been created including identification of five Regional Secretariat NGOs
Success story (points)	As a result of the capacity building work of the project, several NGOs are accessing climate change funding and implementing activities at ground including the delivery of training to other organizations using their skill they learned through the project Three of the Regional Secretariats won the Adaptation at Scale prize in a tough competition between 59 national and international NGOs.
Lessons learned	CAV approach developed by DF and first piloted in Nepal in 2013 under SCRC has now proved to be a model of 'local financing for local adaptation' through small seed money support; In the piloting and scaling up phase of CAV approach, 6,716 households have directly benefited from the implementation of adaptation activities in Nepal
Challenges	
Way forward	Promotion and scaling up the community based climate change adaption technologies in the country
Source/reference	http://www.libird.org/app/projects/view.aspx?record_id=58 [Accessed 06 July 2020] http://www.libird.org/app/news/view.aspx?record_id=58 [Accessed 06 July 2020]
Others	

46. Supporting Developing Countries to Integrate the Agricultural Sectors into National Adaptation Plan

Project Name	Supporting Developing Countries to Integrate the Agricultural Sectors into National Adaptation Plans
Funding Organizations and Fund	UNDP Budget US\$ 0.42 ml
Implementing body, collaborators, Led by?	MoAD, UNDP, FAO
Project Duration	07.2015-12.2018
Research component (Goal, objectives)	Reviewing national policy framework and fostering enabling policy environment for production diversification and dietary diversity
Thematic coverage	Ag& Fs, Awareness raising and capacity development
CC adaptation support type	CRDP
Project geographic cover in Nepal	National
Outputs/ Outcomes (Generated services)	Technical capacity and institution-building on NAPs strengthened Integrated roadmaps for NAPs developed. Evidence-based results of NAPs improved. Advocacy and knowledge-sharing on NAPs promoted
Success story (points)	Evidence-based monitoring frameworks for climate resilient development in key sectors and issues – exchanges between countries including North-South/South-South exchanges Trained technical staff and public service officers with capacity on economic valuation, cost-benefit analysis for climate change adaption options in agriculture sectors
Lessons learned	Climate change concerns as they affect agriculture sector-based livelihoods are associated national and sectoral planning and budgeting processes.
Challenges	Insufficient capacity to undertake economic appraisals of adaptation options, as well as tracking and monitoring systems Inadequate efficiency in resource mobilization processes Insufficient capacity capacities at MoAD and district authorities to facilitate the integration of climate change adaptation into the existing Agricultural Development Strategy (ADS)
Way Forward	Protect agricultural production through mainstreaming adaptation activities into national planning and budgeting processes
Others	
Source/reference	http://www.fao.org/171epal/programmes-and-projects/project-list/en/

47. Supporting Developing Countries to Integrate the Agricultural Sectors into National Adaptation Plan

Project Name	Support to Climate Finance Activities in Nepal
Funding Organizations and Fund	CDKN Budget £40,828
Implementing body, collaborators, Led by?	NDRI, PRC
Project Duration	11.2016-02.2017
Research component (Goal, objectives)	Enhance the capacity of MoF and MOPE in understanding and capabilities towards accessing and utilizing Climate Finance to implement climate actions in the country Support and train potential NIEs
Thematic coverage	Climate Finance, Awareness raising and capacity development
CC adaptation support type	CRDP
Project geographic cover in Nepal	National
Outputs/ Outcomes (Generated services)	Created awareness through sensitization and capacity assessment workshops and Enhanced the understanding on GCF objectives and its direct access modalities to some of the potential National Implementing Entities (NIEs).
Success story (points)	
Lessons learned	
Challenges	
Way Forward	Capacity building for government, development partners and private sector entities interested to engage in GCF process are made separately.
Others	
Source/reference	https://cdkn.org/2017/04/opinion-can-nepal-finance-climate-action/?loclang=en_gb http://www.ndri.org.np/wp-content/uploads/2017/10/Country_Situation_Analysis_report_TAA_S_0072_Final.pdf

48. Sustainable Action for Resilience and Food Security (SABAL)

Project Name	Sustainable Action for Resilience and Food Security (SABAL)
Funding Organizations and Fund	USAID, Budget \$59 ml
Implementing body, collaborators, Led by?	Save the Children, CARE, LiBIRD, NTAG, NEWAH, DADO, DLSO
Project Duration	10.2014- 12.2019
Research component (Goal, objectives)	* Positively manage shocks and stresses related to natural disasters, climate change, political unrest and local shocks. * Improve food security and resilience
Thematic coverage	Ag & Fs, GESI, Health
CC adaptation support type	CbA
Project geographic cover in Nepal	11 districts: Makawanpur, Sindhuli, Udayapur, Khotang, Okhaldhunga, Ramechhap, Dolakha, Sindhupalchok, Kavre, Rasuwa, Nuwakot
Outputs/ Outcomes (Generated services)	*Collaborating, learning and adapting framework *Local resource person and community groups were formed *M&E for Learning, Pause and Reflect, and Adaptive Management approaches *Increased self reliance
Success story (points)	*CLA?? approaches contributed directly to the increased self-reliance among communities, groups, and individuals.
Lessons learned	*Through the discussion of collected data and lessons learned from other programs, Sabal has increased local governments' commitments to sustain the outcomes of the Sabal program long after funding ends.
Challenges	Access to public services, social protection programmes, insurance products, or institutional savings, the rural poor remain exposed to climate risks or fail to recover from shocks
Way Forward	Address root causes of poverty as well as contributing factors to address food security, nutrition and risk management Development and use of effective empowerment and social inclusion framework to ensure gender balancing, equity and social inclusion
Others	
Source/reference	https://www.usaid.gov/nepal/fact-sheets/sustainable-action-resilience-and-food-security-sabal https://usaidlearninglab.org/sites/default/files/resource/files/promoting_sustainability_and_self-reliance_-_use_of_group_capacity_assessment_data_in_nepal.pdf https://nepal.savethechildren.net/about-us/sabal

49. Water Security in Peri-urban South Asia: Adapting to Climate Change and Urbanization

Project Name	Water Security in Peri-urban South Asia: Adapting to Climate Change and Urbanization
Funding Organizations and Fund	International Development Research Center (IDRC), Canada Budget:
Implementing body, collaborators, Led by?	Nepal Engineering College, Center for Postgraduate Studies
Project Year	2010
Project/Research component (Goal, objectives)	Understand the drivers and impacts of urbanization and climate change on water security in four peri-urban locations Explore the implications of rapid urbanization and climate change on water availability for vulnerable communities
Thematic coverage	Urban development ization, water security, GESI (Livelihood)
CC adaptation/support type	CbA
Project geographic cover in Nepal	Peri-urban areas in Kathmandu
Outputs/ Outcomes (Generated services)	*Fresh water flows from per-urban to urban uses as cities are not fully covered with formal water supply system and new demands are generated which utilities are unable to meet Increased demand for land leads to appropriation and contamination of land and water resources in urban and peri-urban locations. *Enhancing the resilience capacity of local people against the compounded effects of urbanisation and climate change by supporting through both hard and soft resilience measures.
Success story (points)	A large number of stakeholders have been brought together that are affected by the process of urbanization and climate induced water insecurity or have potential to influence the issues at the ground level
Lessons learned	Planned urbanization that incorporates environmental planning, climate smart development and local resource use will help reducing vulnerabilities of peri-urban residents Disaggregating vulnerabilities to reach the people who needs help the most Local perception is very close to the climatic trends but there is a need to marry the science and perception for better adaptation outcomes Stakeholders' engagement is not only critical but also paramount for better urban planning aimed at sustainability of resources
Challenges	There is no uniform gender disaggregated data in the water sector collected officially Lack of data provides lack of evidence or status of the changing relationship between gender, class\caste and water access
Way forward	Better urban planning for sustainability of resources through stakeholders' engagement
Source/reference	Prakash, Anjal and Sreoshi Singh (Eds). 2013. <i>Water Security in Peri-urban South Asia: Adapting to Climate Change and Urbanisation</i> . Hyderabad. SaciWATERs and IDRC.
Others	

Annex 5. Criteria for qualifying a CbA project

Ecosystem based Adaptation (EbA)		
Criteria	Indicators	Reference
Resilient Ecosystem	Restore ecosystem services	Colls et al., 2009; Doswald and Osti, 2011; Watson 2011; Maccarthy, 2012; Mercer et al., 2012; Travers et al., 2012; Jones et al., 2012
	Enhance biodiversity	
	Resource Conservation	
	Avoid Mal-adaptation	
	Low- regret	
Local Knowledge-based	Build Knowledge and awareness	Doswaldi and Osti, 2011; Maccarthy, 2012; Mercer et al., 2012
	Local- science partnership	
	Best available science and local knowledge	
	Culturally appropriate	
Flexible management	Adaptive management	Colls et al., 2009; Doswaldi and Osti, 2011; Watson et al., 2012; Mercer et al., 2012; Dixit et al., 2015
	Promote policy and planning	
	Promote existing best resource management	
	Community Based Management	
Multi-stakeholder involvement	Involve local communities and multiple partners	Colls et al., 2009; Doswaldi and Osti, 2011; Watson et al., 2012
	Collaboration and trust	
Diversity and foresightedness	Work for uncertainties	Doswaldi and Osti, 2011; Watson et al., 2012; Jones et al., 2012; Mercer et al., 2012
	Understand trade-offs	
	Welcome variety of adaptation options	
Multi-scale operation	Line with development planning	Colls et al., 2009; Doswald & Osti, 2011; Travers et al., 2012; Mercer et al., 2012; IUCN, 2014
	Support sectoral planning	
	Wide geographical scales	
Good-Governance	Accountable	Doswaldi and Osti, 2011; Jones et al., 2012; Woroniecki et al., 2019
	Transparent	
	Gender balance and empowerment	
	Equity	
	Monitor and Evaluate	
Resilience building	Resilience vs resistance	Colls et al., 2009; Maccarthy, 2012; Watson et al., 2012
	Manage long term climate and variability	
	Reduce disaster vulnerability and non-climatic stress	
Integration with development	Local livelihood	Colls et al., 2009; Perez et al., 2010; Munroe et al., 2012; Rao et al., 2013
Climate Smart Agriculture (CSA)		
Criteria	Indicator	Theme
Crop productivity	Crop yield; Biomass yield	Food security
Benefit cost ratio	Net profits	
Nutritional diversity	Food sufficiency; Number of livestock crop products used	
Nutrient smart	Manure used, Yield per manure use	Adaptation
Water smart	Intensity, hours and amount of irrigation; Soil moisture	
Knowledge smart	Access to information; Ease to use; Compatibility with local knowledge	
Weather smart	Transfer of risk, Harness changed weather	
Condition and position of women and poor	Time save and drudgery; Access to opportunities; Income; Assets; Nutrition; Health	GESI
	Leadership; Decision making role; Recognition	
Energy and carbon smart	Energy efficient; Clean energy	Mitigation

	Carbon emissions; Soil carbon	
Community based Adaptation (CbA)		
Criteria	Options	
Participatory approaches and Priority ranking	<ol style="list-style-type: none">1. Identify communities that are most vulnerable2. Mapping resources, hazards, vulnerability3. Stakeholders: power and institutions mapping4. Identifying drivers and effects of CC,5. Timeline (pattern and trend of hazards) (Berger et al., 2016)6. Crop calendar and harvesting calendar7. Rainfall calendar (most effective in Nepal, Gill, 1991)8. Sharing risk reduction knowledge9. Focus group discussions and Key informant survey10. Ranking Vulnerability and Hazards11. Ranking Coping and DRR strategies	
Capacity development (Reid et al., 2016)	<ol style="list-style-type: none">1. Awareness raising2. Capacity building3. Advocacy4. GESI5. Equipping/strengthening CBOs, CSOs and NGOs6. Collaborating/working with and CBOs, CSOs and NGOs	
DRR management with scientific data (climate modeling, GIS mapping, weather forecasts)	<ol style="list-style-type: none">1. Equip meteorological stations and provide update data and forecasts2. Research, climate modeling and information availability3. GIS, Land use mapping and application of Satellite images	
Enhance local knowledge and combine with scientific data and information	<ol style="list-style-type: none">1. Local knowledge on cloud and their effects; rainbows, sky color.	
Invest on development works that are highly related to climate change adaptation	<ol style="list-style-type: none">1. Integrate CCA in local development planning2. Assist food availability, access to loans, credits, training, free-health, insurance, income generating activities, micro-enterprises	
Monitoring and Evaluation	<ol style="list-style-type: none">1. Flexible planning	
Climate Resilient Development Planning (CRDP)		
Criteria	Options	
Effectiveness	<ol style="list-style-type: none">1. Number of people benefited from the adaptation measures implementation	
Efficiency	<ol style="list-style-type: none">1. Rules of laws for the developmental planning process and institutionalization	
Feasibility	<ol style="list-style-type: none">1. Participation of poor/marginalised/women and disadvantaged groups in CRDP	
Cost effective	<ol style="list-style-type: none">1. Capacity enhancement of local staffs for CRDP	
	<ol style="list-style-type: none">2. Increasing adaptive capacity of through shared vision and common actions	
	<ol style="list-style-type: none">3. Health benefits that created by adaptation planning process	
	<ol style="list-style-type: none">4. Promotion of the long-term sustainability of development	
Sustainability	<ol style="list-style-type: none">1. Priority for nature-based solution in planning process	
	<ol style="list-style-type: none">2. Contribution in reducing risks of immediate, mid-term and long-term climate change risks	
	<ol style="list-style-type: none">3. Coordinated and partnership efforts for the vulnerability assessment and reduction	
	<ol style="list-style-type: none">4. No. of policies/plans developed/improved for climate resilient	
Research and Knowledge Management (RKM)		
Criteria	Options	
Recognition	Inventory the existing knowledge and capacitate them. Appreciate and use the existing knowledge, resource and policy environment	

Governance	Prepare legal requirements relevant to managing data and information. Support climate friendly policies Procedures and Standards.
Technology	Promote sustainable technology infrastructure and practices.
Resilient	Enhance capacity, skills and expertise required to manage CCA. Early warning and preparedness actions.
Funding	Wider collaboration and cooperation Secure sustainable funding to continue CCA.
Sustainability	Use and reuse or share the information.
Innovation	Generation of new data, furnishing early warning information

Sources: Pramova et al., 2011; USAID, 2014; Griffith University and SPREP, 2016; Reid et al., 2016; Berger et al., 2016; Paudel et al., 2017;



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