

Concept Note

Promoting transformative and climate resilient agriculture for sustainable livelihoods and food security in Nepal (CRA)

Nepal | FAO

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**GREEN
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Concept Note

Project/Programme Title:	Promoting transformative and climate resilient agriculture for sustainable livelihoods and food security in Nepal (CRA)
Country(ies):	Nepal (Project sites shown in Annex A)
National Designated Authority(ies) (NDA):	Ministry of Finance
Accredited Entity(ies) (AE):	Food and Agriculture Organization of the United Nations
Date of first submission/ version number:	<u>[2020-05-08] [V1.0]</u>
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Notes

- The maximum number of pages should **not exceed 12 pages**, excluding annexes. Proposals exceeding the prescribed length will not be assessed within the indicative service standard time of 30 days.
- As per the Information Disclosure Policy, the concept note, and additional documents provided to the Secretariat can be disclosed unless marked by the Accredited Entity(ies) (or NDAs) as confidential.
- The relevant National Designated Authority(ies) will be informed by the Secretariat of the concept note upon receipt.
- NDA can also submit the concept note directly with or without an identified accredited entity at this stage. In this case, they can leave blank the section related to the accredited entity. The Secretariat will inform the accredited entity(ies) nominated by the NDA, if any.
- Accredited Entities and/or NDAs are encouraged to submit a Concept Note before making a request for project preparation support from the Project Preparation Facility (PPF).
- Further information on GCF concept note preparation can be found on GCF website [Funding Projects Fine Print](#).

A. Project/Programme Summary (max. 1 page)			
A.1. Project or programme	<input checked="" type="checkbox"/> Project <input type="checkbox"/> Programme	A.2. Public or private sector	<input checked="" type="checkbox"/> Public sector <input type="checkbox"/> Private sector
A.3. Is the CN submitted in response to an RFP?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, specify the RFP: _____	A.4. Confidentiality	<input type="checkbox"/> Confidential <input checked="" type="checkbox"/> Not confidential
A.5. Indicate the result areas for the project/programme	<p><u>Mitigation:</u> Reduced emissions from:</p> <input type="checkbox"/> Energy access and power generation <input type="checkbox"/> Low emission transport <input type="checkbox"/> Buildings, cities and industries and appliances <input type="checkbox"/> Forestry and land use <p><u>Adaptation:</u> Increased resilience of:</p> <input checked="" type="checkbox"/> Most vulnerable people and communities <input checked="" type="checkbox"/> Health and well-being, and food and water security <input type="checkbox"/> Infrastructure and built environment <input type="checkbox"/> Ecosystem and ecosystem services		
A.6. Estimated mitigation impact (tCO₂eq over lifespan)	N/A	A.7. Estimated adaptation impact (number of direct beneficiaries and % of population)	603,000 people (51% women)
A.8. Indicative total project cost (GCF + co-finance)	USD 43.1 million	A.9. Indicative GCF funding requested	USD 34.6 million
A.10. Mark the type of financial instrument requested for the GCF funding	<input checked="" type="checkbox"/> Grant <input type="checkbox"/> Reimbursable grant <input type="checkbox"/> Guarantees <input type="checkbox"/> Equity <input type="checkbox"/> Subordinated loan <input type="checkbox"/> Senior Loan <input type="checkbox"/> Other: specify _____		
A.11. Estimated duration of project/ programme:	Disbursement period: 8 years	A.12. Estimated project/ Programme lifespan	20 years
A.13. Is funding from the Project Preparation Facility requested?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	A.14. ESS category	<input type="checkbox"/> A or I-1 <input checked="" type="checkbox"/> B or I-2 <input type="checkbox"/> C or I-3
A.15. Is the CN aligned with your accreditation standard?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	A.16. Has the CN been shared with the NDA?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
A.17. AMA signed (if submitted by AE)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	A.18. Is the CN included in the Entity Work Programme?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
A.19. Project/Programme rationale, objectives and approach of programme/project (max 100 words)	<p>The project objective is that farmers in the Koshi River Basin are resilient to climate variability and change and adopt sustainable farm-based livelihoods. Barriers to this objective are addressed through three components. First, the scale-up and roll-out of climate resilient and sustainable farming practices will lead to agricultural communities with diversified livelihoods and improved climate resilience. Second, the strengthening of farmer climate and market foresight services will allow farmers to address climate risks and enhance productivity over near and longer timescales. Third, the creation of an enabling environment will facilitate sustainable market driven farming systems more responsive to climate risks.</p>		

B. Project/Programme Information (max. 8 pages)

B.1. Context and baseline (max. 2 pages)

1. **Agriculture in the Koshi River Basin (KRB):** KRB is a crucial region for agriculture-dependent livelihoods in Nepal. KRB is the food basket for the country. The highly productive lowlands (Terai region) of the basin are key producing regions for rice, wheat, maize and vegetables, while tropical fruits and livestock are key sources of livelihoods in the Mid and High hills. KRB is home to around 11.5 million people belonging to over a dozen communities and indigenous groups with livelihoods linked to specific crops and culturally determined practices. Poverty incidence ranges between 20-60% across rural districts (ICIMOD, 2018). Over half of total households (65.3%) in KRB are involved in the agriculture, forestry and fishery sectors (SYB, 2016). Livestock species are dominated by buffalos and goats (0.3 and 0.5 animals per capita, all values are district-level medians).

2. **Hazards and Exposure:** The interaction of climate change and variability (hazards) with the complex topography and fragile soils prevalent in KRB pose immediate risks to agricultural assets and agricultural livelihoods (exposed to hazards) and food security. Both local perceptions (Chaundhary, P. et al., 2018) and quantitative observations (DHM, 2017) indicate that KRB has experienced changes in temperature and precipitation trends and variability. At the national level, historical climate trends observed over the period from 1971 – 2014 indicate a statistically significant positive trend both in maximum temperatures — ~ 0.056 °C/yr (with similar values across seasons) – and minimum temperatures (DHM, 2017). There is however little significant observed trend in precipitation over the same period, except for the High Himalayas of Nepal which have experienced decreasing precipitation trends during the pre-monsoon season (-0.74 mm/yr) and Mid-hills and High-hill districts in western KRB (< -6 mm/yr) (DHM, 2017). Historical trends also indicate a decrease in the number of wet and extremely wet days. However, few districts show statistically significant changes.

3. While trends in precipitation are difficult to discern, seasonal patterns and precipitation and poor water availability mean that agriculture producers are heavily exposed to climate anomalies. Farmers throughout the KRB region face a combined threat from water scarcity during the dry season and excess during the monsoon. At least 30% of KRB rural districts already have insufficient water for agriculture over half of the year due to lack of dry season precipitation and in some cases drought (Barrueto, A. K. et. al., 2018). This situation is aggravated by weak coverage of irrigation systems and districts with less irrigated land and/or higher precipitation variability experience longer periods of water insufficiency (ICIMOD, 2018). Flooding is common, particularly in the Terai and Mid-hills of the KRB. These events are exacerbated when wet-season precipitation coincides with snow and glacier melt (Malla, G., 2009). The Koshi River is also the highest silt-yielding river in the world (Subramanian, V. & Ramanathan, A. L., 1996) and flood has led to significant degradation of agricultural lands (Moench, M., 2010). In 2006, over 40 thousand hectares of paddy were damaged in Sarlahi District during floods. In 2008 a flood displaced over 60 thousand people in the Terai region (MoHA & DPNet, 2009)—with crops and livestock losses estimated at USD18.7 million and USD2.1 million respectively (ADB, 2009). A recent assessment indicates that many farmers in the KRB have been unable to restore farming land that was degraded following another major flooding event in 2009 (Chaundhary, P. et al., 2018). As part of the feasibility work for this project, a more granular assessment of the change in the frequency and intensity of such hazards attributable to climate change will be produced and used to inform the selection of measures to respond to such short-term challenges.

4. Future scenarios developed at the national scale indicate that mean annual and winter/summer temperatures are expected to continue to increase across Nepal under global warming scenarios up to 1 °C by 2016 – 2035 (IPCC, 2017). Increases in annual and seasonal precipitation are also projected (IPCC, 2017). Future climate (Barrueto, A. K. et. al., 2018) scenarios project larger variability in annual (Agarwal, A. et al., 2014) and inter-annual precipitation with increased precipitation intensity and maximums (Christensen, J.H. et al., 2013). At the regional scale the frequency of extreme temperatures and droughts in South Asia is also expected to increase (Hijioka, Y. et al., 2014). Research indicates that projected climate change will result in shifts in the climate suitability of key crops produced in the KRB. It has been found that large areas of productive land in the KRB currently suitable for macadamia and *juglans* (Barrueto, A. K. et. al., 2018) will be subject to future altitudinal shifts that will result in declining suitability for these crops and loss of potential areas for production of these crops. Similar declines have been found for coffee and banana across Nepal (Ranjitkar, S. et al., 2015). Connectivity with local markets and market infrastructure can be a significant challenge due to the topography in KRB and poor road conditions. The mid and high hill regions of the KRB are characterized by landslide risk (Chaundhary, P. et al., 2018).

5. **Vulnerability:** Based on ongoing work by FAO in the KRB, the baseline crop systems can be characterized by high seeding and rates of seed loss, inefficient and ineffective application of fertilizer and other inputs and low levels of plant health over the growing season. Baseline livestock systems can be characterized by poor animal appearance and growth rates, delayed reproductive maturity, reliance on limited number of feed types and higher infestation of pests and parasites. High levels of dependence on agriculture mean that households are acutely exposed to climate variability and change. Broader sensitivity to climate change and variability of districts in KRB is characterized by high levels of poverty with the

human poverty index reaching as high as 0.46 in some districts. Only 14% of small enterprises engage in activities other than agriculture. An outmigration rate of 1.6% per year mean that remittances are important and can constitute up to 26% of household income. Women often remain with households, while men migrate meaning that they are a significant, and the major source, of agricultural labour in the KRB.

6. Adaptive capacity varies across the KRB. Education attainment levels are generally low with literacy rates as low as 42% in some districts and often even lower for women. Health services are strained. Poor building materials and quality means that dwellings and infrastructure are more susceptible to shocks. Households in the KRB also have poor access to mass communication networks, such as TV and radio broadcasts. Access to electricity is low (ICIMOD, 2011). Information on aspects related to capacity to find opportunities for adaptation (i.e. training) and resources to implement actions (i.e. finance) is incomplete or unavailable.

7. **Climate Risk Assessment:** Climate variability and change pose significant risks to food security and nutrition in the KRB due to high exposure levels to climate impacts, high sensitivity due to low income levels, strong dependence on agriculture and low levels of adaptive capacity (Annex B)

8. **Policy Context for Action to Address Climate Risk in the KRB:** Action to reduce the climate change-induced risks to the agricultural sector is a national priority. The National Climate Change Policy (2011) recognizes the barriers and promotes the implementation of climate change adaptation programs, to increase the resilience of local communities and develop capacity for identifying and quantifying climate change, risks and impacts, with the overarching mission of addressing climate change impacts and improving livelihoods to achieve sustainable physical, social and economic development. Nepal's Nationally Determined Contributions (NDCs) reiterate and strengthen these priorities. The NDC builds on priorities established in the National Adaptation Programme of Action (NAPA), Energy Policy, Local Adaptation Programme of Action (LAPA), Environment Friendly Local Governance Framework (EFLG), Low Carbon Economic Development Strategy, and National Action Plans (NAPs).

9. The Agriculture Development Strategy (ADS) 2015 – 2035 is the core policy instrument guiding the long-term development of the agriculture sector in Nepal. The ADS includes specific guidance for sector-specific priorities for action on climate change linked to the national climate change policy framework including a dedicated output on improving the resilience of farmers to climate change, disasters, price volatility and other shocks (Output 2.13). Complementary priorities under the ADS include outputs to encourage Sustainable farming and Good Agricultural, Veterinary and Animal Husbandry practices (GAP and GVAHP) (Output 2.14), Gender Equality and inclusion (Output 1.5) and Irrigation access (Output 2.5). In the near-term, ADS priorities are supplemented by the Nepal Food and Nutrition Security Plan of Action (2013). Further details are presented in Annex C.

10. **Barriers to Action:** Despite clear national priorities and supportive policy frameworks guiding action to address climate risk to agriculture, barriers obstruct progress toward these priorities. In the KRB these barriers are:

I. *Lack of awareness and limited access to information on climate risks and responses.* Agrometeorological information is not readily available and seasonal forecasts and market information are not used to inform farmer decisions. The national agrometeorological observation network relies on 21¹ stations, with only 2 stations located in one of the selected project districts (Dolakha). The Agricultural Management Information System, supported by the project Building Resilience to Climate Related Hazards² (BRCH) aimed at addressing this situation by installing additional stations in 25 pilot districts, yet it includes only one of the districts selected within this project. Most of the existing stations are installed and managed by the Nepal Agricultural Research Council (NARC), but no official linkages have been established for NARC to share and use the collected data (Agarwal, A. et al., 2014). Information on appropriate measures to improve the resilience of farmers and agricultural value chains is limited to areas and beneficiaries of specific climate change and disaster risk management projects. Outside of these projects extension service providers in municipalities are understaffed and have limited capacity to provide advice to address climate risks.

II. *Limited access to financial services and incentives to adopt climate resilient practices.* Adaptation and more sustainable agriculture involves changes in practices that can create costs and risks for farmers. Government subsidies are poorly targeted and normally focus on reducing the costs of inputs without accounting for potentially negative spill-over effects. Government has a short supply of staff and financial resources to cover a wide geographic range and current services are often concentrated to accessible areas. Subsidies are given irrespective of economic wellbeing, causing poor co-financing or matching funds. Poor farmers also have limited access to credit/loan due to lack of collateral. Without financial support or incentives, farmers are unable to make the investments necessary to adopt climate resilient practices.

III. *Weak market information, integration and infrastructure to support resilient farmer livelihoods.* Farmers generally practice subsistence agriculture and face above-average risks from external shocks such as climate extremes and the underlying threat of poor harvests due to adverse growing conditions. Farmers have poor capacity to anticipate these risks and limited access to climate and market information that would help them anticipate and respond to near term climate risks.

¹ Review paper on Agrometeorological Services in Nepal under the Pilot Programme for Climate Resilience (PPCR) in Nepal.

² World Bank Project P127508

In addition, based on an ongoing work by FAO in the KRB, where successful potential adaptation measures have been trialed involving the procurement of new varieties or tools and infrastructure, input suppliers can be slow to respond to new demand due to the poor capacity of farmers to coordinate and suppliers' poor capacity to assess changes in demand. Market linking and post-harvest infrastructure is also poor with access roads and storage and processing facilities often exposed to climate risks and related associated damages from flood and landslide. Poor coordination amongst farmers and weak linkages to market information also means that farmers have poor ability to anticipate and respond to longer terms shifts in growing suitability and consumer preferences.

IV. *Limited institutional, technical and human capacity within the Ministry of Agriculture and Livestock Development (MoALD) to support resilient farming.* Recent restructuring of government institutions at all levels has reduced government capacity to plan, implement and monitor measures to support farmers and agricultural communities. Additional capacity is required at all levels but will develop over time creating a significant near-term gap. Capacity to respond to issues related to climate change and resilience, particularly at the municipal level, will be particularly low until new advisory structures and trained personnel are in place.

V. *Poor capacity to target initiatives addressing the needs of women, indigenous and vulnerable populations.* Marginalized groups have experienced inter-generational discrimination and exclusion due to economic condition, castes, ethnicity, gender, and disability, making them more vulnerable to climate change. Furthermore, local decision-making processes are often dominated by elite groups accentuating inequality.

11. Dynamics of the sector/markets in which the project will operate. Despite poor market linkages there is great untapped potential to develop agriculture markets and strengthen agricultural livelihoods resilience. Farmers in the KRB produce a range of staples as well as high value commodities and livestock such as sweet orange, banana, mango, coffee, macadamia, juglans, oilseed, turmeric, ginger, fowl, goat and cattle (Annex J). Ginger, a significant export crop which is grown in the mid-hills of the KRB, offers opportunities to expand smallholder links to markets. Sweet orange which is also grown in significant quantities in the mid hills, is widely sold in local markets. Livestock is an important source of livelihoods in KRB. More than 80% households raise livestock and the majority (91%) of which are generating income from livestock products and trade (Hussain, A. et al., 2018). KRB has significant potential for development of fisheries and aquaculture production accounting for about 43% of total fish ponds, 56% of water surface area for fisheries and aquaculture and 57% of total national fish production. Fisheries are an important source of livelihoods in Nepal employing around 700 thousand people (53% women) and contributing US\$ 154 million (>1.32 % GDP) of total national income (KC, R. K., 2014).

B.2. Project/Programme description (max. 3 pages)

12. **Project Theory of Change and Component Descriptions:** The project's overarching objective is that farmers in the Koshi River Basin are resilient to climate variability and change and adopt sustainable farm-based livelihoods. This objective directly targets policy goals envisioned in the Nepal government's *Agriculture Development Strategy 2015-2035* and *Food and Nutrition Security Plan of Action* on "Improved Resilience of Farmers to Climate Change and other shocks." At the Fund level, the project addresses the core GCF impact areas of resilient livelihoods and resilient food security, with additional contributions to GCF impact areas of reducing emissions from land-use activities and promoting innovative approaches and technologies for sustainable, climate resilient agriculture, which align closely with ADS priorities. Details on alignment between the ADS components this project will contribute to and GCF result areas and indicators are shown in Annex D.

13. This project addresses current and future climate change risks and vulnerabilities faced by farming communities in the Koshi River Basin (KRB), and the government's capacity to support these communities and remove barriers to adaptation, including lack of awareness, poor market and information access, and limited capacity [refer to section B1] (Annex E). These barriers are addressed in a step-wise and systematic fashion through three components. First, the scale-up and roll-out of climate resilient and sustainable farming practices and value chain infrastructure will address near-term climate variability and extremes as well as longer-term shifts in the suitability of key commodities for food and livelihood security. Second the strengthening of farmer climate and market foresight services will allow farmers to anticipate, plan for and respond to climate risks in the near-term, while allowing for enhanced productivity and value creation over longer-time scales in response to shifts climate suitability. Third, the creation of an enabling environment will support project interventions and the shift from reactive, climate vulnerable farming communities to sustainable, market driven farming systems that are responsive to climate risks and opportunities. The effect of these enabling environment related activities will cut across all project components, allowing for effective, inclusive, and efficient project development and implementation for building climate resilience and improving livelihoods in the short, medium and long term.

14. The project will target at risk farmers from newly formed municipalities in 6 districts: Udayapur, Saptari, Sunsari, Sindhuli, Ramechhap and Dolakha (to be confirmed following further consultation with the government). District selection targets areas in KRB with the greatest exposure to climate related risks, as well as high levels of climate vulnerability based upon the Climate Vulnerability and Risk Assessment methodology developed by the Nepal Ministry of Science, Technology

and Environment to guide adaptation planning exercises at the national level. Additional factors considered in targeting included those areas with high potential for the development of key agricultural commodities and livelihoods activities including staple and cash crops, horticulture, livestock and fisheries (see Annex F). The replication and scaling up of activities and approaches demonstrated and implemented through this project will culminate in a paradigm shift where all Nepali farmers become climate resilient and are involved in sustainable farm-based activities. The core outputs under each component of work to be implemented in KRB under this current project are described in further detail below.

15. Component 1: Scale-up and roll-out climate resilient and sustainable farming practices (indicative budget 40%; indicative portion of GCF grant 36%):

(i) *Output 1.1. Establishing climate informed and GESI responsive farmer system.* Municipal level farmers groups³ will prioritize site specific technologies and practices and small infrastructure based on community specific *Adaptation and risk reduction plans* (ARRP) integrating local and indigenous practices and Gender Equality and Social Inclusion (GESI) principles to empower vulnerable and marginalized groups – including women and landless peoples. The plans will be developed with support from municipal level agriculture advisors that will also deliver extension support through climate farmer field schools (CFFS). CFFS advisors will be integrated into the municipal institutional structures and trained under the project to use prioritization tools and peer-learning processes to demonstrate evidence-based adoption of CRA linked to site specific climate risks. A network of provincial level technical advisors will be established to provide support to municipal level advisors and strengthen links to national policy and extension service providers. Field practices to be prioritized will be focused on staple crops and core livelihoods activities and selected from successful pilot demonstrations in related projects to strengthen climate resilience in the agriculture sector in Nepal (Annex G) and those assessed in preparing Nepal's Climate Smart Agriculture Country Profile. Specific measures for resilient farming systems include application of stress tolerant varieties and livestock breeds, crop intensification and mixed cropping, mulching, improved water conservation and efficient irrigation, zero/low tillage, improved nutrient management, fodder cultivation, stall feeding, animal and improved manure management (Annex H).

(ii) *Output 1.2. Developing resilient, sustainable and inclusive value chains.* Building on municipal CFFS services and the development of climate-informed standards under Component 3, municipal value chain networks will be used as a platform to develop 10-year Local climate risk management plans (LCRP) for key commodity value chains that are significant sources of agricultural livelihoods. Selected key fruit and cash crops and livestock will be prioritized for value chain support based on periodic assessment of current and future projected shifts in climate-suitability. Specific measures integrated into the LCRP will build on the ARRP practices and measures but targeted at managing long-term shifts in climate suitability and climate change risk. Measures will include provision of improved, climate resilient varieties, diversification strategies based on projected changes in suitability supplemented by improved post-harvest management and marketing to address climate risks to agricultural value chains. Standardized training and capacity building packages on resilient value chains will be prepared and rolled out to municipal value chain networks⁴ comprising municipal government and farmers groups, CFFS advisors, agro-processors and other value chain actors. A 'leader farmer' approach will be adopted to allow for producers to engage with and learn from those with greater success in managing climate risks, meeting produce standards, market development and entrepreneurship. The approach and packages developed will be applicable at the national level and provide a mechanism for scaling-out CRA to other regions of Nepal.

(i) *Output 1.3. Providing access to resilient and low-emission small-farm equipment and infrastructure.* The municipal ARRP, and later LCRP, will be used to inform the design and procurement of pre-defined inputs, equipment and infrastructure to enhance resilience to climate risk in key agriculture value chains. Procurement under this output will facilitate more effective delivery of CFFS activities and underpin shifts toward the resilient agricultural value chains envisioned in the LCRP. These activities will be coordinated through municipal governments under advice from CFFS advisors. Infrastructure measures will be designed to withstand anticipated changes in frequency and intensity of weather extremes and will adhere to climate risk guidelines developed by government⁵. Municipal farmers groups and value chain networks will be provided a limited budget to prioritize inputs, equipment and infrastructure based on their respective ARRP and/or LCRP. Specific on-farm equipment and small tools for resilient farming systems will include stress tolerant seeds and livestock breeds, small pump irrigation systems and livestock pens. Specific infrastructure measures for resilient value chains will include improved product storage and processing structures, market access infrastructure and works and measures for improved water management including bunds and stabilization measures as well as water collection ponds. Procurement practices will be guided by GESI principles to ensure inclusive and equitable distribution of benefits.

16. Component 2. Strengthening Farmer Climate and Market Foresight Services (indicative budget 49%; indicative portion of GCF grant 54%):

(i) *Output 2.1. Developing agro-met forecast and market advisory services linked to resilient, sustainable and inclusive value chains.* Agrometeorological system infrastructure and connectivity will be enhanced to support CFFS

³ Established under Component 3 Output 3.1.

⁴ Established under Component 3 Output 3.1.

⁵ Developed under the Pilot Programme for Climate Resilience (PPCR) in Nepal.

advisors, municipal administrations, farmers and other value chain actors to assess, anticipate and respond to climate variability and risks to agricultural production and distribution systems. Automated weather stations with agro-met functionality will be upgraded and procured to increase the density of the agro-met data collection network. Instruments will be linked to new processing and analysis hubs that will be established and strengthened by the project at provincial and national levels to enhance the skill and quality of agro-met advisory and climate risk management products for farmers and CFFS advisors. Climate informed, market information services will also be developed to enable municipal value chain networks to adjust to anticipated climate shocks and respond to and stimulate market demand for more sustainable and inclusive agricultural products. Farmers will be provided with integrated advisories combining agro-met and market demand forecasts at different stages of the growing season to help farmers adjust to and manage medium and longer-term shifts in climate suitability and profitability. In parallel, the long-term capacity of the agro-met advisory system will be strengthened through training centers at provincial levels for CFFS advisors and establishment of a national center of excellence for agro-met advisory services linked to the Department of Hydrology and Meteorology (DHM) and the National Agricultural Research Council (NARC). Operations and maintenance protocols will be updated and mainstreamed to ensure the functionality and longevity of system instrumentation and hardware.

(ii) *Output 2.2. Providing financing mechanisms based on climate and market foresights.* This output will involve the development of institutional arrangements, standard operating procedures and guidance for two financing mechanisms to address near and long-term climate risks to farming systems. The first mechanism, a forecast-based financing (FBF) scheme to enable early warning and early action in response to the risks posed by climate variability and change (e.g. losses due extreme weather events; drop/increase of crop and livestock suitability), will target municipal level farmers groups including climate vulnerable and asset-less farmers, especially women. This scheme will be managed by municipal governments and implemented in partnership with the World Food Programme (WFP), building upon FBF infrastructure already developed by WFP in the lower KRB. The second mechanism will aim to leverage funds pooled by municipal value chain networks to secure additional finance from agricultural-finance providers and rural lending institutions to support procurement and infrastructure works identified in the LCRP to address longer-term climate-related risks and opportunities for agricultural value chains. Project funds will be used to support trials of these mechanisms to demonstrate their viability for wider adoption by government and other agricultural-finance providers and rural lending institutions.

17. Component 3. Creating an enabling environment for climate informed, market-driven agriculture / farming based livelihoods (indicative budget 11%; indicative portion of GCF grant 10%):

(i) *Output 3.1. Developing local resilient, sustainable and inclusive value chain networks* – This output will work through MoALD to establish the legal and institutional basis for the farmers groups and value chain networks that will drive implementation of the project at the field level. Structures linking agricultural advisors at provincial and municipal levels to national policy makers in MoALD will be established. Municipal level farmer’s groups will be created to develop ARRPs, coordinate CFFS activities and facilitate the uptake of CRA practices and technologies. These groups will be managed by the farmers in collaboration with municipal level agriculture advisors according to GESI principles. Over the life of the project, additional local value chain actors will be integrated with these groups to establish municipal value chain networks that will be charged with developing LCRPs and implementing value chain support packages. Under this output institutional strengthening and capacity building initiatives will be implemented and knowledge management protocols and systems established to ensure that information flow between technical advisory services at national and provincial levels and field offices at municipal levels to facilitate delivery of CRA programmes at scale. Budget and monitoring systems will also be in place to support preparation, implementation and monitoring of CRA programmes.

(ii) *Output 3.2. Project Management* – Under this output project implementation and monitoring will be supported. The project will establish project management offices in the project area, a project management information system, and a project monitoring team. The major activities will include project specific planning and budgeting; procurement of equipment and materials, including computers, office equipment, and communication facilities; recruitment of project staff and consultancy services; and coordination of monitoring and reporting on project activities and impact.

18. Implementation arrangements The Accredited Entity of the project is FAO. The Ministry of Agriculture and Livestock Development (MoALD) will act as Executing Entity for the project. FAO will also provide technical backstopping and coordinate capacity building work as Executing Entity. The Accredited Entity function will be segregated internally from the Executing Entity function to ensure the accountability of overall project implementation.

19. Management and operational bodies responsible for overseeing and implementing project activities at the national, provincial and local (municipal) levels will include: (1) Project Steering Committee (PSC) at federal level, chaired by the federal secretary of MoALD, to provide overall direction and guidance for project activities; and (2) Project Coordination Unit (PCU) at provincial level, under the guidance of MoALD provincial secretary, to coordinate project execution and monitoring/ reporting of project progress. At the municipal level project support units will be established to support delivery including planning and implementation at local levels, output monitoring, ensure stakeholder engagement, and reporting back to PCU and PSC. NARC will be a key project partner for testing, piloting, validating and evaluating new low-carbon and climate-resilient agriculture technologies and practices under the guidance of relevant national and international agricultural research and technical advisory institutions. The project will also establish a multi-stakeholder advisory group

that will encourage active engagement from relevant NGOs, international organizations, private sector organizations and local communities on specific issues / activities as appropriate. Further details on members, roles and relationships among these different tiers are shown in Annex I.

20. **Suitability of the Accredited Entity (AE):** FAO has global and country level roles, both normative (identifying global good practices) and operational (e.g. supporting National Adaptation Plans), on building national sectoral capacities for climate change and disaster resilience. FAO has been working in Nepal since 1951 and has extensive expertise in delivering projects of large scale on agricultural development, climate change and disaster risk management. FAO in Nepal addresses four priority areas of food and nutrition security and safety, institutional and policy support, market orientation and competitiveness, and natural resources conservation and utilization. Since its inception in Nepal, FAO has completed over 400 projects in Nepal and has made major achievements related to policy dialogue and formulation support, technical assistance and capacity building, national data and information management, and innovative technology transfer.

21. **Risks and Mitigation Measures:** Key societal, environmental, financial and operational factors that will pose a risk to project implementation and sustainability and corresponding mitigation strategies are listed below:

Potential Risk	Risk type and Rating	Mitigation Strategy
Weak political commitment and leadership at national and local levels may cause project delays	Political - Medium	Key stakeholders have been extensively and regularly involved in concept note design. Project goals are clearly linked to national and sector priorities. Project implementation arrangements have been developed to ensure key actors at national, provincial and municipal levels are provided key roles in implementation and buy-in.
Recent structural changes in government lead to weak coordination	Political - Medium	The proposed implementation arrangements aim to ensure capacity for coordination will be available at each level of government. Implementation arrangements have also been carefully aligned with institutional changes anticipated as part of government restructuring to reduce potential delays from information asymmetry.
Climate shocks and disasters lead to damage project investments and delay program implementation	Operational - Medium	Infrastructure measures and tools will be procured and implemented based on national and international best practices for climate risk mitigation. Risk mapping will be used to identify and mitigate climate risks to project investments.
Limited involvement of women, IPs, Dalits and other marginalized groups may slow achieving the project impact.	Operational - Low	The project incorporates GESI principles into key implementation structures of the project at national and municipal levels to ensure that full participation of marginalized groups is mainstreamed in project planning, decision-making and implementation.

B.3. Expected project results aligned with the GCF investment criteria (max. 3 pages)

22. **Impact:** The project will make a significant contribution to increased climate-resilient rural livelihoods and sustainable development in Nepal. Over 115,000 households, representing around 603,000 people (51% female), will be supported to adopt climate-resilient technologies and practices through their direct involvement in the project. Approximately 53,000ha of agricultural/ livestock/ and fishery production area will be covered by project activities to improve climate resilience, through strengthened adaptive capacity of the farmers, villages and supporting institutions, and reduced exposure to climate variability and change through implementation of CRA practices.

23. As noted in Section B2, early project activities (Output 1.1 and 3.1) will principally be delivered through municipal farmers groups to be designed and formed using GESI approaches to ensure that the project targets a high proportion of the most vulnerable producers in target areas. Project activities will target measurable improvements in adaptive capacity of these groups through technical advice (Output 1.1), finance to address climate risks (Output 2.2) and the development of income generating opportunities linked to high quality and high value agricultural products (Output 1.2). The increased generation and use of climate information in decision-making, particularly at the municipal level, is also a key target outcome of the project (Output 2.1, Output 1.1 and Output 1.2). Procurement practices adopted will adhere to guidance and standards developed in Nepal and elsewhere⁶ to avoid lock-in of small infrastructure measures and hardware that will be vulnerable to climate change (Output 1.3).

24. **Paradigm Shift:** The project aims to drive a transition from prevailing farming systems characterized by high levels of climate risk and low value produce toward more sustainable, market driven farming systems that are responsive to climate risks. Early project activities will focus on delivery of more traditional, public extension models based on CFFS to manage near-term climate risks to farmers and vulnerable groups (Output 1.1 and Output 1.3). Measures at municipal level to strengthen climate and market advisory services will enhance the capacity of farmers and agricultural producers to manage

⁶ For example, Nepal Pilot Programme for Climate Resilience Screening Tools and guidance for climate resilient infrastructure.

seasonal climate risks and better match produce to sources of demand (Component 2). These activities will be implemented in parallel with measures at the national level to strengthen policies and regulatory frameworks as well as product development, marketing and branding activities for more sustainable, climate resilient and inclusive value chains. These activities will culminate in municipal value chain networks working together through mutual interest to deliver climate resilient products to local and international markets (Output 1.2).

25. The design of project outputs incorporates more traditional and also innovative institutional structures to strengthen specific knowledge on climate resilient agriculture and collective learning. Municipal farmers groups and value chain networks will be the primary channel for monitoring and collecting lessons learned from project activities. Activities led by these groups will be shared and used to inform policy makers responsible for implementing Nepal's national climate change and agricultural priorities (output 3.3). Key project components including the municipal institutional structures (Output 3.1), climate and market advisory services (Output 2.1) and financing mechanisms (Output 2.2) have been designed in a way that they can be easily scaled-up at reducing average cost. The institutional frameworks and market development activities developed under the project (Output 1.3 and Output 3.1) will be widely applicable to other regions of Nepal and may also serve as examples to other countries.

26. **Sustainable Development Potential:** The project will result in economic, social and environmental co-benefits, and gender-sensitive development impacts as discussed below.

I. **Economic co-benefits:** Project activities will support farmers to enhance farm-based livelihoods through more sustainable, market driven farming systems that are responsive to climate risks. Climate resilient technologies and practices will be combined with improved climate and market advisory services to help farmers diversify and intensify their farming systems and increase yield and income (Output 1.1, Output 2.1 and Output 2.2). Farmers will additionally benefit from the climate and market foresight based advisories in their production planning, and from the linkages with markets and private sector for the marketing of their farm produce (Output 1.2). As a result, modest increases in the turnover of agri-businesses in target regions (e.g. input supplier, traders and processing facilities, service providers for small infrastructure maintenance) will increase due to the additional output and investments derived from project intervention. Supplementary income generated in the KRB will contribute to growth and job creation beyond agriculture as well as poverty alleviation. A more detailed financial and economic analysis will be undertaken in the preparation of the Funding Proposal.

II. **Social co-benefits:** The project interventions will have a range of social benefits, and support inclusive strengthening of most vulnerable communities, especially the poor, marginalized and asset-less households (women and the indigenous people) in the KRB. Farmers, especially women and other vulnerable communities, be empowered to work in harmony with the local governments and communities and contribute to more resilient socio-ecological systems (Output 1.1). Additional co-benefits of the project include reducing social-economic inequality and rural and urban divides through providing entrepreneurship opportunities and job creation in the rural areas and creating rural-urban linkage through the development of market value chains (Output 1.2).

III. **Gender specific impacts:** Specific adaptation and entrepreneurial skill development aimed at women, resulting in alternative livelihood options and increased income, will lead to a positive sustainable cycle in which women will be able to re-invest this income into their and their children's education, health and nutrition. Climate resilient activities related to improved water management will reduce women's time-poverty and lead to improve in health, education, and overall family welfare. Through promoting the involvement of women in decision-making, training, and CFFS activities, arenas where women have traditionally been excluded, this project will ensure the widespread adaptation of sustainable land-use practices, ensuring maximum delivery of environmental co-benefits. Given the predominant role of women in agriculture, livestock rearing and fodder, grasses, and water collection, coupled with the increasing rate of male out-migration, through adherence to GESI principles in designing key activities the project will leverage the large role that women will need to play in the adoption of climate resilient agriculture.

IV. **Environmental co-benefits:** Scale-up and rollout of climate resilient agriculture technologies and practices under the project will provide environmental co-benefits including better environmental health, ecosystem services and resilience (Output 1.1). Improved soil and water management, improved manure management, the enhanced use of deep rooted and drought tolerant crop varieties will reduce emissions, increase soil carbon sequestration and improve resource management. Tree crop farming (fruits, timber, fodder, agroforestry, etc.) and better crop husbandry will decrease run-off, soil erosion and the loss of organic matter, improve nutrient cycling, and reduce the need for chemical fertilizers and pesticides. This will decrease GHG emissions, air and water pollution. Likewise, the use of locally adapted indigenous crops and varieties and animal breeds will perform well under low input (chemical fertilizer and pesticides). Improved cattle shed management will also add to environmental security and cattle health.

V. **COVID-19:** The full effects and severity of the COVID-19 crisis on Nepal are not yet known. What is clear is that the crisis has immediate short-term effects on livelihoods and food security and will deeply affect society and the country's economic systems in the post-pandemic phase of recovery. Since this project will address sustainable livelihoods and food security, the realities of the crisis necessitate efforts be undertaken as part of the CRA project to strengthen beneficiaries' resilience. Recovery efforts must be undertaken in ways that foster climate resilient, low-carbon, and sustainable growth to

restart the economy and rebuild livelihoods quickly and smoothly through climate resilient pathways. In light of this, the CRA project will identify specific areas where it can support recovery efforts by increasing overall resilience with strong social and economic co-benefits and coordinating closely with relevant recovery programs of national institutions, with support from development partners and small and medium enterprises in the sector.

27. **Needs of the recipient:** Nepal is a Low-Income Country, with 28.6% of the total population and the vast majority of the rural population living in multidimensional poverty, according to the 2018 Multidimensional Poverty Index analysis. It is also a highly climate-vulnerable country, ranking 14th in the 2016 Global Climate Risk Index. Although the government is making national budget resources available to invest in climate related technologies, hardware, and research and development (R&D), these investments are inadequate to support the full needs of capacity development for technical staff and farmers that will be needed to bring about a paradigm shift in national agricultural practices and value chains. Capacity development will be particularly important following the institutional reform taking place in Nepal where agricultural support services will be transfer to municipalities. It will therefore be crucial to support building the necessary capacities at all governance levels.

28. A Climate Risk Vulnerability Assessment (CRVA), taking into account the differing hazard, exposure and vulnerability levels, was conducted for each of the KRB districts. These results, along with other criteria such as production of staple crops, cash crops, livestock and fisheries, were used to identify the six KRB project implementation districts of Udayapur, Saptari, Sarlahi, Sindhuli, Ramechhap and Dolakha (Annex A). These districts cover three provinces (Province 1, 2 and 3), cut across the High hills, Mid hills and Terai regions and represent the districts that are simultaneously most vulnerable to climate risks and, at the same time, have the agricultural potential to most benefit from project activities. High occurrence and vulnerability to flood and landslides, along with drought and changing temperature patterns, affect these districts, resulting in a need for immediate interventions to increase resilience and increased access to agricultural product markets to improve incomes and longer-term adaptive capacity. These six districts together represent over 19% of the total KRB population. The project will target especially vulnerable populations within the selected districts, including women, landless and indigenous people. Through the funding proposal a more detailed assessment of the needs of these vulnerable groups across agro-ecological zones will be undertaken.

29. **Country ownership.** This project is a high priority for the government of Nepal due to its high potential to contribute to national climate change priorities and to support implementation of climate change elements of the ADS. Through improving farmer adaptive capacity and providing subsistence climate-resilient alternative livelihoods, this project also directly contributes to achieving the mission of the National Climate Change Policy to “address adverse impacts of climate change and utilize the opportunities created from it to improve livelihoods and achieve climate-friendly physical, social and economic development.” Initiatives promoted in Nepal’s NDC, including implementation of adaptation, knowledge management and climate mitigation with private partnership programs, are also integrated in the CRA project design.

30. This project has been prioritized for development by the Nepal NDA as part of a package of GCF initiatives that aim to address immediate and longer-term climate change risks to critical ecosystems and communities in the most vulnerable, but also populous and productive regions of the country. Specifically, this project will complement two additional GCF projects being developed in the Koshi River Basin and the proximate Gandaki River Basin; namely the Building a Resilient Churia Region in Nepal (AE: FAO) project and the Improving climate resilience of vulnerable communities and ecosystems in the Gandaki River Basin project (AE: IUCN). These two projects have been developed in partnership with the Ministry of Forests and Environment (MoEF) and focus primarily on improved management of ecosystems underpinning rural livelihoods in these regions as a pathway to better manage climate risks and climate resilience. This project (the CRA project) is being developed under the leadership of MoALD and will complement these projects by targeting farmer systems in the Koshi River Basin to strengthen resilience to near-term climate variability risks to farming operations and longer-term climate induced shifts in the suitability of key sources of agricultural livelihoods. The activities have been designed under the guidance of the NDA to complement each other and maximize linkages between the natural resource management driven approach of the former two projects and the agricultural value chain driven approach of the CRA project.

31. MoALD officials have been actively involved in the design of the CRA project and will continue to play the major role in project development, implementation and monitoring. The MoALD, is responsible for overseeing the development and growth of the agricultural sector, is the main executing entity for this project. MoALD, composed of the previous MoAD and MoLD, has experience in implementing projects related to farmers field demonstrations, irrigation, cooperative farming, value chain development and community livestock development; promoting organic farming; and supporting disaster-hit farmers. Thus, the MoALD is well placed to coordinate and deliver this project and will collaborate with other relevant sector ministries to ensure synergies across the Nepal GCF portfolio; particularly MoEF, which as noted above, will lead implementation of two complementary GCF projects in proximate areas of the Koshi and Gandaki river basins. Close collaboration with MoALD in project design and implementation also ensures that proposed interventions and strategies align with national and local level policies and priorities. FAO’s track record in Nepal of specializing in agriculture, climate

change, and market related projects, showcases FAO's capacity to ensure project delivery as the accredited entity (refer to section B2)

32. Multiple consultations have taken place with government officials, both at the federal and provincial levels, District Agriculture Department Officials (DADO), who accompanied and supported field missions to scope potential project sites, and conduct vulnerability and local feasibility assessments, and with civil organizations, including indigenous organizations and other INGOs and NGOs working in the area. Consultations will continue to be conducted to ensure equitable representation of all potential beneficiaries and project stakeholders and participants will also include members from the private sector. The NDA has been directly involved in project preparation, in collaboration with the FAO country office, and several missions from FAO staff from June 2017 to March 2018, culminating in the preparation of this Concept Note. The 20% of total budget co-financing commitment by the government also demonstrates a strong level of ownership. In order to initiate the transformational changes proposed by the project, the provincial governments are willing to commit financial resources under complementary funding arrangement. The NDA has also provided financial support in developing a full funding proposal.

33. **Efficiency and Effectiveness:** Decline in yields due to climate change leads to a decrease in profits and revenues for farmers' in the project area. With the project these losses would be avoided or at least partially offset. The operational work program in this project has been designed in such a way that it will address these issues and other emerging climate related issues effectively through the demonstration of efficient management of natural, social and financial resources at the community level. In addition, facilitating linkages with markets, private sector bodies will assist farmers' get fair prices for their produce, and will add to their income.

34. Initial estimates indicate that the CRA practices adopted will increase the agricultural land equivalent in the project area by up to 25%. This would generate an additional cash flow to producers, reaching up to 150,000 households. At the household level this would lead to increase in the returns to family labour as a result of higher and stable yields and lower production costs. Additional financial and economic growth will be generated by the project in KRB as the turnover of agricultural sector businesses including input suppliers, traders and processing facilities will increase due to higher output volumes. This will stimulate the local economy and lead to increased consumption of goods by rural households, and higher investment on climate resilient agriculture technologies and practices. A detailed financial and economic analysis and an ex-ante GHG mitigation potential will be undertaken at the time of the preparation of the Funding Proposal for GCF.

B.4. Engagement among the NDA, AE, and/or other relevant stakeholders in the country (max ½ page)

35. **Technical Working Committee:** Key stakeholders have been consulted extensively during the preparation of this Concept Note. To facilitate consultation and coordination a Technical Working Committee (TWC) was established comprising the NDA and experts from government agencies at the Ministry of Agricultural Development (MoAD) and Ministry of Livestock Development (MLD) (now MoALD) as well as representatives from FAO, NARC, NGOs, development partners, private sector organizations, CGIAR Centers and groups representing indigenous people and women. The TWC met several times to discuss the Theory of Change, implementation plan, stakeholder engagement strategy, and project scope & scale. This draft Concept Note has been reviewed and approved by the TWC and relevant secretaries at MoALD.

36. The TWC has also sought the views and feedback of a wider group of stakeholders in preparing and refining the Concept Note. Numerous national level consultation workshops were organized in 2017 to define the project activities and scope. A validation workshop was organized in February 2018 to seek views on the refined project theory of change and the final component overviews. It was attended by over 30 participants representing government, NGO, development partners, private organizations, academic institutions, research organizations, civil society organizations, rights-based organizations, indigenous people's representatives and peasant farmers' coalition representatives. Additionally, bilateral meetings were organized with several funding partners to discuss potential co-financing arrangements. Meetings were also held with other GCF accredited entities working in Nepal to assess potential thematic and geographic overlaps.

37. **Field level consultations:** Consultations has also been organized at the local level in the KRB. The project formulation team conducted field visits in 13 districts of the KRB region and consulted with District Agriculture Development Offices (DADOs) and District Livestock Services Offices (DLSOs). During these field visits, the team interacted with government line agencies, farmers, and other stakeholders to identify major bottlenecks to addressing climate change challenges in agriculture and the achievement of government priorities at the local level. District level staff of the MoAD/DoA supported the project formulation team in preparing local feasibility studies, vulnerability assessments and technology gap analyses. Key interventions were selected based on vulnerability assessments and technology gap analyses to ensure the project is grounded, need-based, bottom-up and relevant to local farming communities.

38. **Future consultations:** During the preparation of full feasibility and baseline studies the project formulation team will organize a series of more focused consultations with municipal level stakeholders in the target areas to further refine the identification of location-specific problems within project areas and devise tailor-made, customized action and implementation plans. Consultation meetings with indigenous communities, landless farmers and other marginalized groups

will also be organized to inform the preparation of the gender action plan, environmental and social safeguards documents and Prior Informed Consent. The TWC will be convened at regular intervals to guide the feasibility study preparation process. A final validation workshop will be organized at the national level to seek endorsement of the final draft product by the NDA, relevant ministries and other project stakeholders.

C. Indicative Financing/Cost Information (max. 3 pages)

C.1. Financing by components (max ½ page)

39. **Process for estimating costs:** Estimates for full project financing are provided in the table below. These estimates are based on a desktop review of costs for similar initiatives being implemented at a pilot scale in Nepal. More detailed estimates of costs will be developed through comprehensive feasibility studies on component options, assessment of existing program operations and effectiveness, and the planning out of co-financed counterpart funds in government budget. The table below is indicative at the time of concept note preparation and does not account for potential contributions from counterparts including the World Food Programme under Component 2, Output 2.2. Additional co-financing partners will be approached during the preparation of full component feasibility studies.

Component/Output	Indicative cost (million USD)	GCF financing		Co-financing		
		Amount (million USD)	Financial Instrument	Amount (million USD)	Financial Instrument	Name of Institutions
Component 1	16.2	11.9	Grant	4.3	Government budget – Municipal Admin & ADS	MoALD
Component 2	20.3	17.7	Grant	2.6	Government budget – Municipal Admin	MoALD
Component 3	4.6	3.3	Grant	1.3	Government budget - ADS	MoALD
<i>Project Management (Output 3.2)</i>	2.0	1.7	<i>Grant</i>	0.3	<i>Government budget</i>	<i>MoALD</i>
Indicative total cost (USD)	43.1	34.6 (80%)		8.5 (20%)		

C.2. Justification of GCF funding request (max. 1 page)

40. **Critical need for GCF support:** Nepal is a Least Developed Country that is particularly at risk from climate variability and change. The agriculture sector is a key driver of economic development in Nepal and a critical source of livelihoods and food security. The Government of Nepal has acknowledged consistently through policy and planning exercises at the national and local levels that investment in the sector to strengthen resilience to climate change will be critical for ensuring the prospects for future, positive economic development and stability. Given these circumstances, the GCF with its unique mandate, is the most appropriate funding mechanism to partner with the Government of Nepal to invest in action consistent with the country's long-term priority to strengthen the resilience of farmers to climate change, disasters, price volatility and other shocks. The investment project envisioned in this Concept Note has been designed as a grant to supplement public investment needed to support implementation of ADS activities consistent with this priority. As detailed in Section C1, the Government of Nepal will commit public funds as co-financing to support this project, but will be unable to generate the full envelope of resources required.

41. The components of investment described in this Concept Note are considered part of essential, catalytic public sector action to realize a national transformation of the agriculture sector from its current state to one that is both more resilient to climate shocks and able to attract more private investment based on the enhanced capacity of local farmers and agri-business to deliver high quality agricultural products. GCF support, and its associated safeguards requirements, will help ensure that the transition facilitated through this investment project will also take better account of the needs of particularly vulnerable and marginalized groups and minimize any potential negative environmental impacts.

42. **Justification for the high level of concessionality:** The level of concessionality is appropriate given the overall risk profile of the agriculture sector in Nepal and the Koshi River Basin more specifically, the vulnerable nature of the target beneficiaries and the limited prospect for external investment in this sector in Nepal in the near-term. As noted in Section B1, the project will be targeting regions of KRB most at risk from climate variability and change. The target beneficiaries

generally have low levels of capacity and resources and the grant supported measures outlined in this Concept Note are considered the most appropriate for their particular circumstances.

43. Nepal is considered a high-risk location for investment and is generally not rated by sovereign credit ratings agencies. The World Bank estimates shadow sovereign credit ratings for unrated countries including Nepal and has found that the credit worthiness of the country has declined over the past decade. Nepal's current shadow sovereign credit rating is CCC+⁷. The country also ranks low on measures for ease of doing business⁸ and innovation⁹. This status makes it difficult for the government to raise external capital for essential national development initiatives such as the outputs of the ADS. Domestic capital markets are also underdeveloped. The assessment above indicates that a grant investment by the GCF would not displace investments by the private sector or investments in similar initiatives that might be supported by commercial finance.

44. While Nepal's current ability to attract capital to invest in national development priorities is still relatively weak, the Government of Nepal is considered to be a prudent manager of fiscal resources and has overseen recent reductions in the ratio of public debt to GDP¹⁰. As a result, grants are the most appropriate vehicle for support from the GCF at this stage. Under this project, funds and activities will in most cases be disbursed and directed through existing financial and operational mechanisms for management of fiscal programs established within the Government of Nepal. With these mechanisms funds flow from national agencies to agencies at provincial and municipal levels for programme implementation and fund disbursement. Technical assistance and hardware will in some cases also be procured directly by national agencies.

45. **Alternative funding options:** The relatively weak capacity and limited scale of capital available to private agri-business in Nepal means that alternative funding options to support the investment project described in this Concept Note are limited to public sources. As noted above, the Government of Nepal will commit public funds as co-financing to support this project but will be unable to generate the full envelope of resources required either from internally available budget or from debt markets. Other sources of public finance include official development assistance provided either bilaterally or through multilateral development banks or funding instruments such as the Global Environment Facility (GEF).

46. A stocktaking of related public development assistance projects was prepared for this Concept Note to assess the potential for alternative funding options and potential synergies and overlap with this project (Annex G). Based on this review, it is considered unlikely that alternative public sources of finance would be made available to target the type of specific, catalytic and large-scale investment linked to the ADS that is envisioned in this project. International public finance has focused on delivery of general support to agriculture sector development and pilot initiatives focused on trialing measures to address climate risks to the sector. Two exceptions to this assessment are the "Building Climate Resilient Communities through Private Sector Participation" component of the Pilot Programme for Climate Resilience (PPCR) in Nepal implemented by the International Finance Corporation and the "Reducing vulnerability and increasing adaptive capacity to respond to impacts of climate change and variability for sustainable livelihoods in agriculture sector" implemented by FAO with support from GEF. These programmes include elements of agri-business development and adoption of local level resilience planning and extension services that are highly relevant to this project. The design and findings of these projects has been used to guide the proposed design of the project described in this Concept Note.

C.3. Sustainability and replicability of the project (exit strategy) (max. 1 page)

47. **Sustainability:** The longer-term sustainability of the project activities is underpinned by four key pillars:

I. **Public goods for more resilient agriculture in KRB and Nepal:** The project will result in the delivery of public goods and knowledge products that will serve as the basis for enhanced public and private sector investments in resilient agriculture in KRB and Nepal more broadly. The agro-met network (Output 2.1), small infrastructure and tools (Output 1.3) established by the project will be public goods that, with adherence to operations and maintenance protocols, will provide actionable information and services to enhance the resilience of farming systems in the KRB. The agro-advisory service hubs at provincial and national levels will be able to link to other systems established by past and future projects to enhance the density and quality of climate projections and advisories for areas of the country beyond the KRB. Training centers at provincial levels for municipal advisors and establishment of a national center of excellence for agro-met advisory services linked to the DHM and NARC will ensure that human capacity to manage the system into the future is in place (Output 2.1).

II. **Enhanced institutional capacity for delivery of climate resilient agriculture services at the farmer level:** As noted in Section B1, the Government of Nepal is in a stage of institutional transition. New municipalities will be charged with delivering government services and programmes at the local level. In the case of agriculture, the number of local level agricultural advisors will need to expand to meet the requirements of the larger number of local government units. This project will work to ensure that municipal government administrations and agriculture advisors in the target areas have the

⁷ See: Basu, K, De, S, Ratha, D, and Timmer, H. 2014. Sovereign ratings in the post-crisis world. An analysis of actual, shadow and relative risk ratings. World Bank.

⁸ See: <http://www.doingbusiness.org/rankings>

⁹ See: <https://www.globalinnovationindex.org/analysis-indicator>

¹⁰ See: WTO. 2011. Nepal Trade Policy Review

capacity to provide a range of services and products including CFFS (Output 1.1 and Output 3.1) and early warning, early action finance (Output 2.2) to support climate resilient farming systems and value chains. These services will be maintained beyond the life of the project through the continued implementation of ADS programmes targeting enhanced climate resilience and complementary priorities. Municipal governments will be supported by MoALD technical advisors at provincial and national levels that will develop skills and capacity through the project to advise municipal administrations outside the project areas.

III. Profitable, resilient and sustainable agricultural product value chains: A core element of the project theory of change is the creation of an enabling environment that will lead to the proliferation of sustainable market driven farming systems that are responsive to climate risks. The vehicle for this transition will be municipal value chain networks under Output 1.2 to ensure that farmers and agriculture value chain actors are able to better manage climate risks and respond to and anticipate shifts in climate suitability. This support will ensure farmers can deliver high quality and higher value produce that are adapted to climate risks and shifts in long-standing patterns of suitability. Market development activities (Output 1.2 and Output 3.1) will work simultaneously to expand markets for farmers in target areas. Increases in productivity and income resulting from project will raise the potential for modest increases in government revenue and support the continuation of services to be provided by the project and/or pay-for-use systems linked to the capacity of value chain actors to continue to deliver high quality and high value agriculture products (Output 1.2).

IV. Scalable measures consistent with government priorities: Project activities have been designed to align carefully with the aims and objectives of national priorities for climate resilience in the agriculture sector set forth in the key policy frameworks identified in Section B.1 to ensure that the project outputs will be mainstreamed into the delivery of new projects and programmes developed in support of these priorities. Monitoring and evaluation of project activities (Output 3.2) will ensure that lessons learned will be used to inform and adjust project activities as well as future programming activities.

48. **Replicability and Exit Strategy**: The project has been designed in a way that will leverage existing and newly established institutional structures to maximize the potential to replicate the project activities in regions outside the KRB either directly by government or through external sources of public and private finance. As described above, agro-advisory service hubs at provincial and national levels will enhance the quality of climate projections and advisories for areas of the country beyond the KRB. MoALD technical advisors at provincial and national levels will also develop skills and capacity through the project to advise municipal administrations outside the project areas. The CRA value chain support activities implemented under the project will also be applicable at the national level and provide a mechanism for scaling-out CRA to other regions of Nepal. Further, standardized training and capacity building packages and operating procedures will support efforts to replicate project activities outside of project areas and beyond the life of the project.

D. Supporting documents submitted (OPTIONAL)

- Map indicating the location of the project/programme
- Diagram of the theory of change
- Economic and financial model with key assumptions and potential stressed scenarios
- Pre-feasibility study
- Evaluation report of previous project
- Results of environmental and social risk screening

Self-awareness check boxes

Are you aware that the full Funding Proposal and Annexes will require these documents? Yes No

- Feasibility Study
- Environmental and social impact assessment or environmental and social management framework
- Stakeholder consultations at national and project level implementation including with indigenous people if relevant
- Gender assessment and action plan
- Operations and maintenance plan if relevant
- Loan or grant operation manual as appropriate
- Co-financing commitment letters



PROJECT / PROGRAMME CONCEPT NOTE Template V.2.2

Are you aware that a funding proposal from an accredited entity without a signed AMA will be reviewed but not sent to the Board for consideration? Yes No



PROJECT / PROGRAMME CONCEPT NOTE Template V.2.2

List of Annexes

Annex A: Map of selected districts as target of the project interventions

Annex B: Climate Risk and Vulnerability Assessment for the KRB region

Annex C: Key National Policies Relevant to CRA Project

Annex D: Relevant ADS Outputs and GCF Result Areas and Indicators

Annex E: Theory of Change describing problems and corresponding interventions linked with national and global priorities

Annex F: Key economic indicators of project area

Annex G: Related public development assistance projects

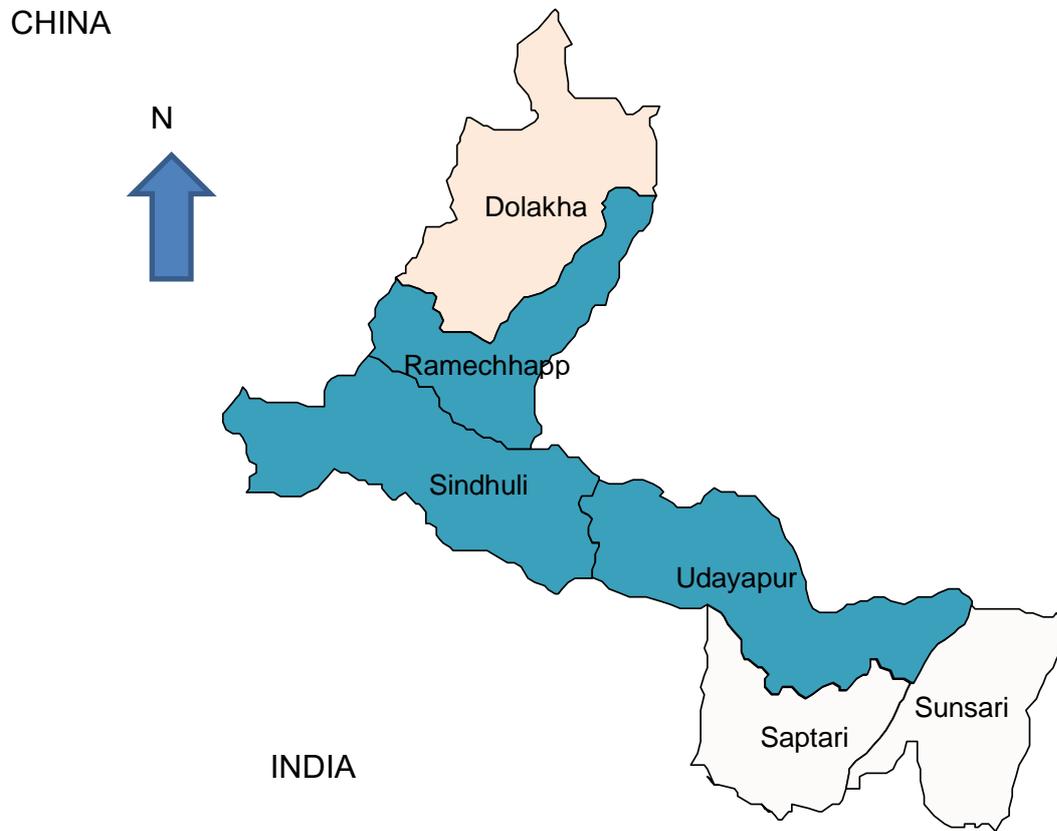
Annex H: Detailed smartness assessment for top ongoing CSA practices by production system as implemented in Nepal

Annex I: Institutional Arrangement for Implementation of CRA Project

Annex J: Key Commodities - CRA Target Districts (Tons of production)

Annex K: References

Annex A. Map of selected districts as target of the project interventions



Annex B. Climate Risk and Vulnerability Assessment for the KRB region

A preliminary climate change risk and vulnerability assessment (CRVA) was conducted for the 28 districts of the Gaupalika province in the KRB. The approach was based on the Vulnerability and Risk Assessment framework set out in the National Adaptation Plan Formulation Process¹⁹. The VRA framework is based on the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC)²⁰. The approach by MoPE¹⁷ defines climate risk as the interaction of hazard, exposure and vulnerability. Vulnerability, in turn, is defined as the propensity of being negatively affected by climate change impacts, and encompasses sensitivity and adaptive capacity (Figure 1). Sensitivity as defined by MoPE¹⁷ represents inter-alia the presence of people, and their cultural, social, economic assets that could be affected by climate hazards. Spatially explicit information on cropping patterns and farming systems—key indicators of sensitivity of the farmers to climate hazards—was not available at this stage. Nevertheless, the observed changes in the climate (Section B.1) and the perception of the communities, e.g. as to the decrease in water availability and increased climatic variability¹⁹ suggest further constraints on agriculture in the following decades. Further information on farming systems will be added during the proposal phase.

A variety of socio-economic and biophysical indicators were used to formulate and index for each of the four risk components. Indicators were initially selected after MoPE (2017), and finally chosen according to data availability (Table 1). In some instances indicators were directly obtained from the literature or online databases for every district. In other cases, an estimate of the indicator was computed from one or more proxies. In that case, the indicator was calculated by first standardizing the proxies and then calculating a weighted average, assuming equal weights. In this and all cases where a weighted average was computed, the input values were previously standardized from 1 to 100.

For every district, an index was formulated for each of the components of risk and vulnerability as a weighted average of the respective standardized indicators, assuming equal weights. Vulnerability was calculated as the difference between the standardized values of sensitivity and adaptive capacity—higher adaptive capacity is assumed to translate into lower vulnerability. Finally, the risk was calculated as the weighted average of the indices of hazard exposure and adaptive capacity. With this approach, the districts with higher risk values were indicative of priority areas in need of adaptation interventions. Preliminary results indicated that districts Ramechhap, Dhanusa, Saptari, Makawanpur, Solukhumbu, and Sarlahi were at higher risk from climate change impacts. Other districts such as Dolakha, Siraha, Sindhuli, Sunsari and Udayapur have high levels of hazard risk and/or exposure to climate change impacts, but lower levels of vulnerability due to lower levels of sensitivity to such impacts and higher levels of adaptive capacity (Figure 2 below). In a project context, the inclusion of target districts with different levels of hazard, exposure and vulnerability increase potential for productive learning across districts and regions on ways to reduce overall risk of climate change impact. As a result, the final selection of project districts will target a contiguous target area covering each of the distinct agroecological regions of Nepal, while also incorporating districts with high overall levels of risk and/or lower levels of vulnerability to encourage productive learning and knowledge exchange.

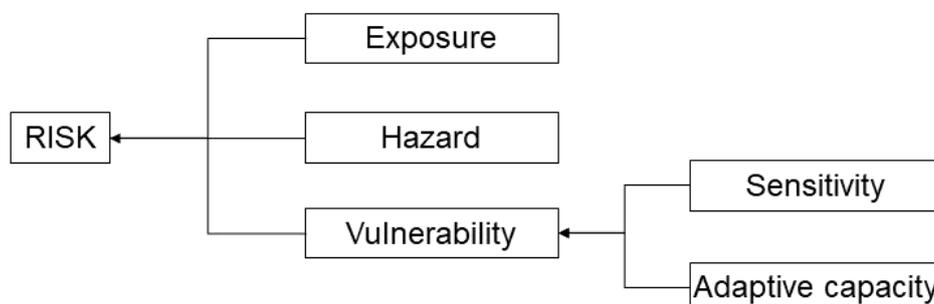


Figure 1 Climate change risk and vulnerability assessment framework. Adapted from MoPE (2017).

Table 1 List of indicators or proxies used in the risk and vulnerability assessment.

Component	Indicator	Indicator value or proxies
Hazard	Extreme heat	Summer (JJA) temperature increase.
	Flood	(frequency * area)/ district
	Drought	Summer (JJA) and Winter (NDJ) precipitation; Summer (JJA) and Winter (NDJ) precipitation reduction (RCP4.5, 2050); HH with sufficient water for crop.
	Extreme weather variability	Inter-annual variability in summer precipitation (historical coefficient of variation).
Exposure	Farming population	Number of workers in Agriculture, forestry, fisheries.
	Irrigation schemes	Percentage of irrigated land.
	Agricultural land area	Area (in hectares) of arable land.
	Population of livestock	Per-capita number of cattle/buffalo (including for milking), ducks, goat, pig, sheep.
	Agriculture market network	Average distance to cities.
	Sensitivity	Income disparity
Land holding, land ownership and tenure		Ratio of number owned holdings to number of holdings.
Livelihood dependency on agriculture		Percentage of household engaged in small scale enterprise outside of agriculture; Percentage contribution of remittance on HH income.
Gender inequality		Percentage of female economically active; Percentage of female able to read and write.
Seasonal and out migration		Percentage of net migration rate (out migrants).
Adaptive capacity	Safe drinking water	Percentage of households having access to drinking water.
	Public health	Population per health institution.
	Education	Literacy rate.
	Housing	Percentage of cemented houses; Percentage of households with TV, radio; Percentage of households electricity access.
	Equity	Ratio of male/female of agricultural holder.

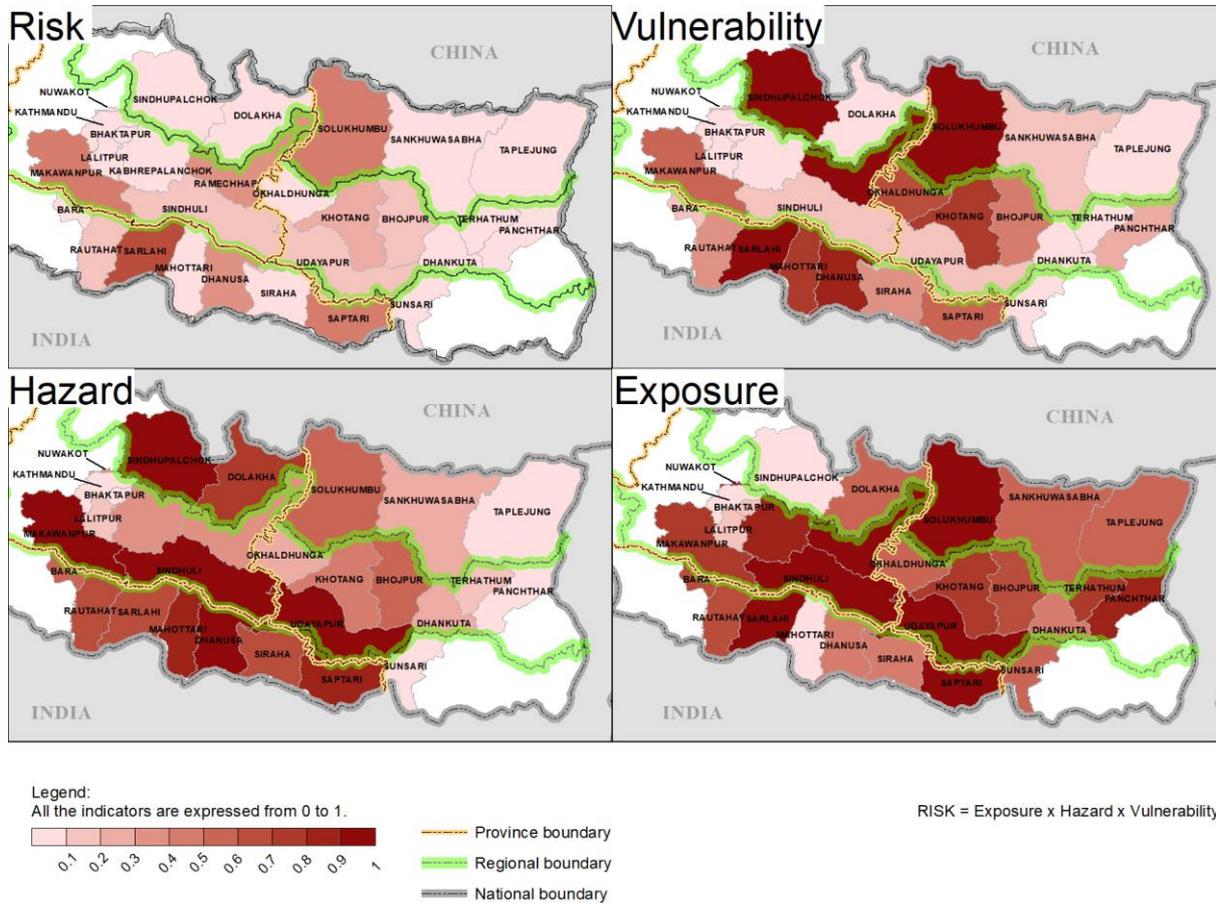


Figure 2 Maps of KRB districts in Nepal showing risk and its component indices (vulnerability, hazard, exposure) derived using the Nepal NAP Climate risk and vulnerability assessment framework.

Annex C. Key National Policies Relevant to CRA Project

Policies	Areas that CRA project contribute to
Agriculture Development Strategy, ADS (2015-2035)	<ul style="list-style-type: none"> - Introduction of appropriate adaptation mechanisms to improve adaptation to climate-led productivity decline and resilience to climate change, disaster, price volatility and other shocks; - Clean development mechanism and disaster risk reduction as measures to reduce agricultural mitigation; - Four areas of interventions (governance, production, profitable commercialization, and competitiveness) and four measures to achieve this (efficient and sustainable use of natural resources such as water, land, soil, forestry, increased resilience to climate change and disasters, effective agricultural research and extension, and efficient use of agricultural inputs); - Diverse agricultural finance and insurance for demand-driven finance and agricultural insurance
National Determined Contribution (2016)	<ul style="list-style-type: none"> - Prioritization of climate-resilient sustainable land and forest management, ecosystem, rehabilitation and restoration, strengthening community-based NRM, and improving agricultural techniques; - Undertaking scientific (physical and social sciences) approaches to understand and deal with the impacts of climate change in mountains, hills and low-land ecosystems and landscapes, developing and implementing adaptation strategies for climate change affected sectors
National Agriculture Policy, 2004	<ul style="list-style-type: none"> - Increased agricultural productivity, commercialization of agriculture, improved market access, protection of biodiversity and natural resources for environmental sustainability; - Establishment of surveys and surveillance systems to assess impact of excessive rains, droughts, diseases, insects and other natural calamities and mobilize agricultural reliefs; - Participatory watershed management and conservation of river basin conservation; - Expansion of insurance on crop, livestock, poultry, seeds of selected crops, and high value agricultural products; - Encouraging organic farming with a certification service; - Encouraging cooperative-based agriculture enterprises
Fourteenth development plan	<ul style="list-style-type: none"> - Increased agricultural budget by 76.6% compared to the previous plan and emphasising development and dissemination of environment friendly agricultural technologies, agro-biodiversity conservation, promotion and utilization
Nepal Agriculture and Food Security Investment Plan (2010)	<ul style="list-style-type: none"> - Plan for enhancing institutional and technical capacity of the ministries for agriculture development and their agencies for climate risk management, disaster preparedness and reduction of agricultural risks
NARC strategic vision for Agriculture Research Policy (2011-2030)	<ul style="list-style-type: none"> - Promoting conservation tillage (e.g. Green manure, cover crops and mulching) to maintain cover on soil surface using residues (mulching) or vegetation to maintain soil fertility in agro-forestry systems; - Effective Microorganisms (EM) technology, EM composting and Integrated Plant Nutrient System to improve soil quality and health; - Establishment of runoff and water quality gauging stations and metrological stations and simulation of climate variability scenarios for agricultural crop production; - Studying hydrological process, their control and linkages in watersheds and downstream resources and develop models for hydrological, land use, cropping systems, soil loss, and water management; - Estimation of carbon sequestration under various agricultural practices and development of appropriate mitigation measures for GHGs emission from agriculture and livestock; - Development of climate friendly agricultural technologies; - Generation and promotion of technology, knowledge, and information to cope with the negative impacts of climate change
Nepal Biodiversity Strategy and Action Plan (2014)	<ul style="list-style-type: none"> - Establishment and strengthening functional linkage between the National Agriculture Genetic Resources Center (Gene Bank) and community-based seed or gene banks; - Development and implementation of incentive measures for on-farm conservation of agro-biodiversity, and elimination of perverse incentives;

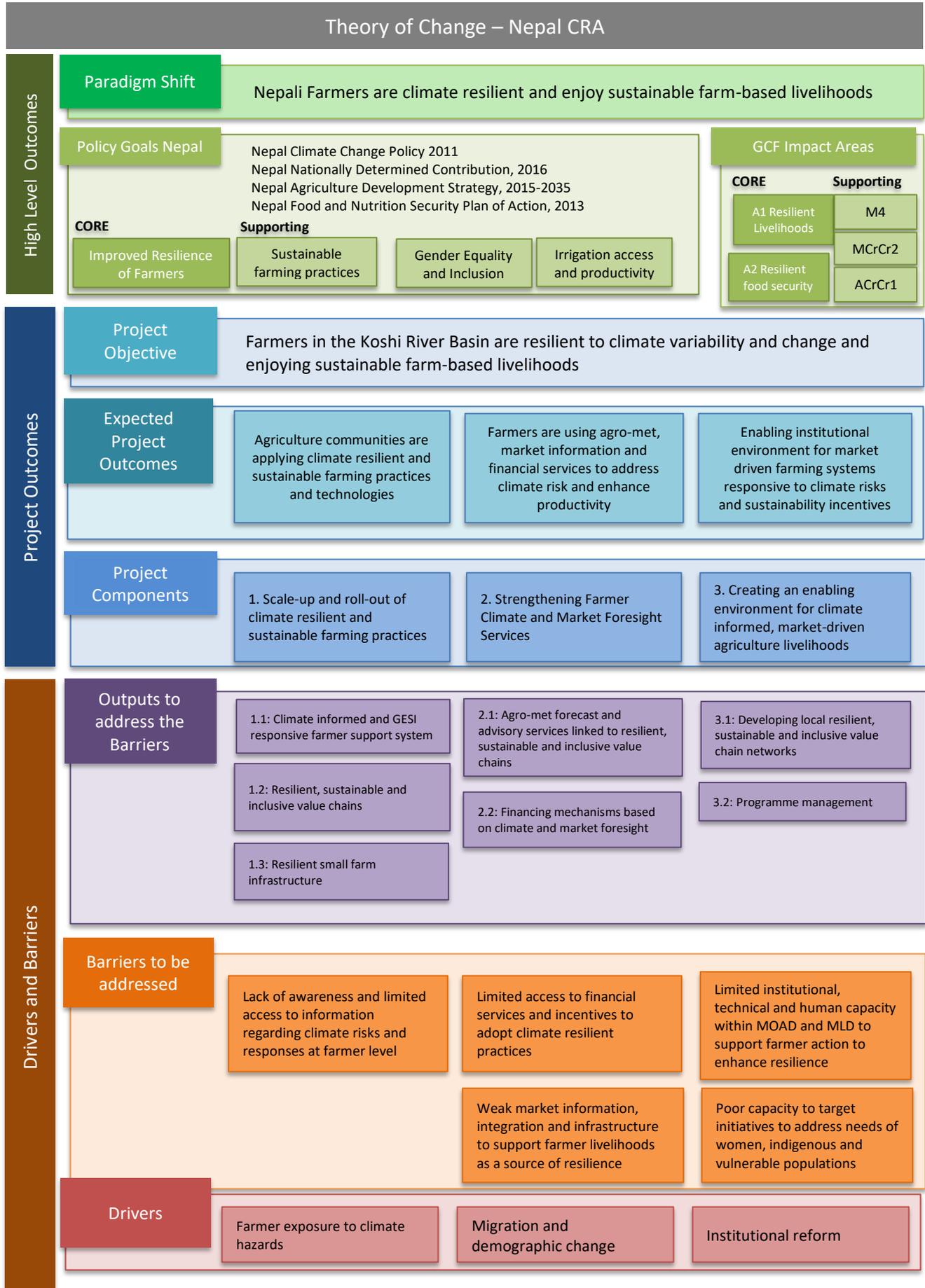
	<ul style="list-style-type: none"> - Expansion of organic management, IPM and IPNM activities at the local level; - Conservation of threatened species, varieties, breeds and wild relatives of domesticated crops
National Agro-biodiversity Policy 2014	<ul style="list-style-type: none"> - Identification, protection, conservation, development and sustainable use of climate resilient, nutrition dense and diseases and pests-resistant local cultivars
Irrigation Policy (2013)	<ul style="list-style-type: none"> - Sustainable and reliable irrigation services to all lands suitable for cultivation; - Study of the negative impacts of population growth, migration, climate change and effects of water-induced hazards to water sources and irrigation and implement adaptation activities
FNSS Report (2016), FNSPA (2016), NAP for ZHC	<ul style="list-style-type: none"> - Giving high priority to climate resilient crop species and varieties
NAPA (2010)	<ul style="list-style-type: none"> - Promoting community-based adaptation through integrated management of agriculture, water, forests and biodiversity; - Building and enhancing adaptive capacity of vulnerable communities; - Community-based disaster management for facilitating climate adaptation; - Empowering vulnerable communities through sustainable management of water resource and clean energy supply
Climate Change Policy (2011)	<ul style="list-style-type: none"> - Enhancement of climate adaptation and resilience capacity of local communities for optimum utilization of natural resources and efficient management; - Capacity development for identifying and quantifying present and future impacts of climate change and adapting to climate risks and adverse impacts of climate change
Climate Change Adaptation and DRM in Agriculture – Priority Framework for Action (2011-2020)	<ul style="list-style-type: none"> - Strengthening institutional and technical capacity in research and development, technology transfer, tools and methods for assessment and mainstreaming climate change adaptation and disaster risk management within agriculture and food security policies, strategies and plans; - Assessing and monitoring climate risks (current and future) and vulnerabilities, and enhance early warning systems for proactive climate risk management and adaptation; - Improving knowledge management, databases, awareness raising, and education on climate change impacts, adaptation and disaster risk management in agriculture; - Reducing climate related risks and the underlying vulnerabilities by implementing technical options in agriculture and livestock sectors using community-based adaptation and technology development/transfer; - Knowledge and communication between research and development in general and to the extension system in particular, through generation, documentation, sharing and application of information; - Gender equity through integrating and mainstreaming priorities of women in all the activities at every level
Environment-friendly Local Government Framework (2013)	<ul style="list-style-type: none"> - Energy and water efficiency; - Reduced use of dung cakes combined with biogas plant establishment and improved animal urine and dung management; - Rainwater harvesting and management of water recharge system; - Training on bio-pesticides and pesticides made from plants, compost making and use of organic manures; - Protection measures adopted to control soil erosion, landslides and flooding
Renewal Energy Subsidy Policy (2016)	<ul style="list-style-type: none"> - Solar energy for drinking water and for irrigation of agricultural land managed by a community or a private company; - Wind energy and solar-wind hybrid energy systems for irrigation; - Subsidies for solar PV water mills, solar PV pumping systems, ICT, biomass energy and thermal systems are important technologies to promote CSA
Nepal Country Report on Sustainable Development Goals 2016-2030	<ul style="list-style-type: none"> - Increase access to finance for agriculture through loans; - Reduce use of fertilizers and increase bio-fertilizers in agricultural production; - Increase the proportion of the population with climate change education and training on early warning system; - Minimize greenhouse gas emissions in different sectors including agriculture; - Integrate climate change into all relevant policies; - Conservation of lakes, wetlands and ponds as important elements to combat water scarcity and increase agricultural production.

Annex D: Relevant ADS Outputs and GCF Result Areas and Indicators

ADS Output	GCF Result Area	GCF Indicator
<p>2.11 Improved Resilience of Farmers to Climate Change, Disasters, Price Volatility, and Other Shocks</p> <p>2.5 Irrigation Area expanded equitably and viably, and improved Irrigation Efficiency and Management</p>	<p>Result Area</p> <p>A.1 Increased resilience and enhanced livelihoods of the most vulnerable people, communities, and regions</p> <p>A.2 Increased resilience of health and well-being, and food and water security</p>	<p>Total Number of direct and indirect beneficiaries; Number of beneficiaries relative to total population</p> <p><i>A1.1. (a) Estimated change in losses of lives (for males and females) due to the impact of climate-related disasters</i></p> <p><i>A1.1. (b) Estimated change in losses of economic assets (USD equivalent) due to the impact of extreme events and climate related disasters.</i></p> <p><i>A1.2 Number of individuals and percentage of population (and relative disaggregation of women and men) adopting climate resilient livelihood options (including fisheries, agriculture, tourism, etc.)</i></p> <p><i>A2.2 Number of food-secure households (in areas/periods at risk of climate change impacts)</i></p>
<p>1.5 Mechanisms Established for Gender Equality and Social and Geographic Inclusion in the ADS</p>	<p>Cross Cutting</p> <p>A.5 Strengthened institutional and regulatory systems for climate responsive planning and development</p> <p>A.6 Increased generation and use of climate information in decision making</p> <p>A.7 Strengthened adaptive capacity and reduced exposure to climate risks</p> <p>A.8 Strengthened awareness of climate threats and risk reduction processes</p>	<p>ACrC1 Number of technologies (including gender – friendly technologies) and innovative solutions transferred or licensed to promote climate resilience</p> <p><i>A5.1 Number of gender – friendly policies, institutions, coordination mechanisms and regulatory frameworks that improve incentives for climate resilience and their effective implementation.</i></p> <p><i>A6.1 Number of climate information products/services in decision-making in climate-sensitive sectors developed, delivered, and used</i></p> <p><i>A7.1 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</i></p> <p><i>A7.2: Number of males and females reached by climate related early warning systems and other risk reduction measures established/ strengthened</i></p>

ADS Output	GCF Result Area	GCF Indicator
		<i>A8.1: Number of males and females made aware of climate threats and related appropriate responses</i>
2.12 Sustainable farming, good agricultural practices (GAP), good veterinary animal husbandry practice (GVAHP) are established and adopted	<p>Result Area</p> <p>M.4 Reduced emissions from land use, deforestation, forest degradation, and through sustainable management of forests and conservation and enhancement of forest carbon stocks</p>	<p>Tonnes of carbon dioxide equivalent (t CO₂eq) reduced</p> <p>Volume of finance leveraged by Fund funding</p> <p><i>M4.1 Tonnes of carbon dioxide equivalent (t CO₂eq) reduced, avoided and/or GHG removals by sinks (including increased removals) – from REDD+ and other land use activities</i></p>
	<p>Cross-Cutting</p> <p>M.5 Strengthened institutional and regulatory systems for low-emission planning and development</p> <p>M.9 Improved management of land or forest areas contributing to emissions reductions</p>	<p>MCrC2 Number of technologies and innovative solutions (including gender – friendly technologies and solutions) transferred or licensed to support low-emission development</p> <p><i>M5.1 Number of policies, institutions, coordination mechanisms and regulatory frameworks that improve incentives for low-emission planning and</i></p> <p><i>M.9.1 Hectares of land or forests areas under sustainable management or improved protection and management leading to reduced GHG emissions and/or enhancement of carbon stocks</i></p>

Annex E. Theory of Change



Annex F . Key economic indicators of project area

District	Total agri-cultural land (ha)	Agri-cultural land (%)*	Average land holding	Rainfed area (%)	Land-less families (%)*	Total milk production (liter)	Total meat production (MT)
Dolakha	26,845	12.25	0.59	75	3.46	15,699	2,649
Ramechhap	30,372	19.64	0.69	83	3.67	18,301	3,539
Udayapur	28,162	13.65	0.42	59	7.12	31,779	6,176
Sindhuli	26,623	10.69	0.46	67	6.56	13,979	4,255
Saptari	80,678	59.19	0.61	60	7.41	41,882	7,750
Sunsari	81,269	64.6	0.50	10.8	14.96	42, 858	8,236

Source: CBS, 2016, Statistical Agriculture Book, 2016 *Source: CBS, 2011/12 Agriculture Sampling Census

*Source: DCC websites of respective district and converted through <https://www.thecalculatorsite.com/conversions/area.php>

Annex G: Related public development assistance projects

No	Relevant Existing Initiative	Main Agency	Objective	Relevant Barriers	KRB Coverage	Activities relevant to this project
Sample Projects Related to the Implementation of Climate Resilient and Adaptive Agriculture Practices						
1	Right to Food	CARE Nepal	Strengthen capacity of civil societies and local government to mobilize and monitor policy implementation regarding food security	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Institutional reform	Okhaldhunga, Siraha, Udayapur	Ensure research and adaptive technologies reach smallholders Increase awareness of climate impact, adaptation options and strategies Build capacities of government and civil society groups to address food insecurity
2	GEF/LDCF- Reducing vulnerability and increasing adaptive capacity to respond to the impacts of climate change and variability for sustainable livelihood in agriculture sector	FAO	To improve adaptability of communities and stakeholders through increase of institutional capacities and transfer and adaptation of practices and technologies in agriculture and livelihood sectors	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Limited access to financial services and incentives to adapt climate resilient practices	Udayapur, Siraha	Increasing technical and institutional capacities in agriculture and livestock sector To promote sustainable climate-resilient and environmentally-friendly agriculture practices To promote awareness and capacity building
3	National Agriculture Development Support Programme (NASDP)	Helvetas	Provide farmers relevant knowledge, information and technology to sustainably increase productivity and develop decentralised and pluralistic research and extension system to provide technology and services as needed by farmers	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Institutional reform	Khotang, Udayapur, Okhaldhunga, Sindhuli, Ramechhap	Institutional and governance strengthening at municipality level (training, giving money directly to municipality through governance system) Climate resilient agriculture practices Expanding market network



4	Riverbed Farming for the Landless in Nepal	Helvetas	Improve food security and income of landless, land-poor and severely flood affected households throughout Terai	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level	Rautahat, Sarlahi, Dhanusha, Sansari	Promoting seasonal vegetable cultivation in riverbeds and making riverbed farming integral part of Terai agricultural development
5	Himalayan Climate Change Adaptation Programme (HICAP)	ICIMOD	Enhance resilience of farmer communities, especially women, through increased understanding of vulnerabilities, opportunities and potentials for adaptation	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Limited access to financial services and incentives to adapt climate resilient practices Institutional reform	Hindu-Kush Himalaya	Development of climate and water availability scenarios Development of knowledge on environmental and socio-economic impacts and responses to climate change at different levels Creation of concrete and actionable proposals for adaptation strategies and policies
6	Renewable Energy for Rural Livelihoods (Under the National Rural Renewable Energy Development Programme)	UNDP	Increase rural electrification rates through renewable and innovative energy sources	Weak market information, integration and infrastructure to support farmer livelihoods as a source of resilience	Nation-wide	Development of mini/micro hydro and solar PV systems And productive energy uses Innovation of financial mechanisms to attract private investments
Sample Projects Related to Building Agricultural Markets and Businesses						
7	High Mountain Agribusiness and Livelihood Improvement Project	ADB	Increase income and employment in high mountain people through value chain development of niche agricultural, livestock, and MAPs/NTRFPs	Weak market information, integration and infrastructure to support farmer livelihoods as a source of resilience Limited access to financial services and incentives to adapt	Sankhuwasabha, Solukhumbu, Dolakha	Linkages with downstream businesses to take advantage of gradual improvement in infrastructure to create demand for mountain products Stimulation of private sector agribusiness development and risk reduction



				climate resilient practices		
8	Enhancing Livelihoods of Smallholder Farmers in Central Terai (ELVIS)	ADRA	Contribute to SDG 1, 2, 5 (End poverty in all forms; end hunger, achieve food security, improved nutrition and promote sustainable agriculture; achieve gender equality and empowerment)	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Weak market information, integration and infrastructure to support farmer livelihoods as a source of resilience Limited access to financial services and incentives to adapt climate resilient practices	Bara, Rautahat, Sarlahi, Mahottari	Increase of organizational capacities of farmers for commercial vegetable and livestock production Improvement in goat management and vegetable and lentil production Linkage of input and output markets
9	Nepal Market Development Programme (SAMARTH)	DFID	Improve economic performance of rural farmer sectors through the Making Markets Work for the Poor (M4P) approach	Weak market information, integration and infrastructure to support farmer livelihoods as a source of resilience Limited access to financial services and incentives to adapt climate resilient practices	Dairy in Terai region, mechanization in Udayapur, tourism in high hills	Marketing of: crop protection inputs, dairy, fish, ginger, livestock feed, mechanization, media, pigs, tourism and vegetables
10	Rural Enterprises and Remittances - SAMRIDDHI	IFAD	Provide sustainable sources of income to poor households, migrant families and returnees in the Eastern and Central Regions of Nepal, by supporting the creation and expansion of family, micro, small and medium rural enterprises, both in	Limited access to financial services and incentives to adapt climate resilient practices Weak market information, integration and infrastructure to support farmer	Saptari, Siraha, Sunsari, Bara, Dhanusa, Mahottari, Rautahat, Sarlahi, Dhankuta, Khotang, Terhanthum, Udayapur, Okhaldunga, Sindhuli	Promotion of rural enterprises, skill training and harnessing remittances for productive activities



			the farming and off-farming sectors	livelihoods as a source of resilience		
11	Micro-Enterprise Development Programme	UNDP	Reduce poverty by transferring entrepreneurship development knowledge and skills, creating, promoting and sustaining micro-enterprises, and generating self-employment and opportunities to rural poor	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Limited access to financial services and incentives to adapt climate resilient practices Institutional reform Weak market information, integration and infrastructure to support farmer livelihoods as a source of resilience	Phase 1: 11 districts Phase 2: 25 districts Phase 3: 36 districts Phase 4: 38 districts	Capacity building of governments, agencies and private organizations for sustainable delivery of micro-enterprise services Capacity development, training and skills especially for women, poor and disadvantaged
Sample Projects Related to Information Services, Including Early Warning Systems						
12	Establishment of Regional Flood Information System in the Hindu Kush Himalayan Region (HKH-HYCOS)	ICIMOD	Minimize loss of lives and livelihoods through reducing flood vulnerability	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level	Hindu-Kush Himalaya	Establishment of flood observation network and flood information systems Creation of framework that allows for cooperative sharing of regional flood data and information
13	Koshi Basin Programme	ICIMOD	To enhance regional coordination to improve wellbeing of local communities and sustainable use of ecosystem goods and services	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Limited access to financial services and incentives to adapt	Koshi-River Basin	Creation of basin-wide knowledge base for institutional, socio-economic and biophysical information for policy interventions Development and piloting of adaptation and livelihood strategies to address climate change Development of enabling environment



				climate resilient practices Institutional reform		
14	Transboundary Flood Resilience in Nepal and India	Lutheran World Relief	Strengthen community resilience to effects of flooding	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Institutional reform	Kamala and Koshi River Basins along Nepal-India border	Implementation of cross-border Early Warning Systems Strengthening of government and community capacities in DRR
15	Community Based Flood and Glacial Lake Outburst Risk Reduction Project (CFGORRP)	UNDP	Reduce human and material losses from Glacier Lake Outburst Flooding (GLOF) and flooding events in Terai and Churia regions	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Institutional reform	Solukhumbu, Mahottari, Siraha, Saptari and Udayapur	Infrastructure development Community based early warning system implementation Community training and capacity building
16	Comprehensive Disaster Risk Management Programme	UNDP	Strengthen institutional and legislative aspects of disaster risk management	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Institutional reform	54 districts (Terai: 19 districts, Hills: 27 districts, Mountains: 8 districts)	Formulation and implementation of policies, legal frameworks, land use planning to address risks Enhancement of governmental and local community capacity to respond to disaster and climate risk
Sample Projects Related to Irrigation						
17	Community Managed Irrigated Agriculture Sector Project-Additional Financing	ADB	Enhance livelihoods of rural smallholders through improving farmer-managed irrigation systems	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Limited access to financial services and incentives to adapt climate resilient practices Institutional reform	Dolakha, Khotang, Okhaldhunga, Panchthar, Ramechhap, Sankhuwasabha, Saptari, Sarlahi, Sindhuli, Sindhupalchok, Solukhumbu, Sunsari, Taplejung, Terhathum, Udayapur	Provision of irrigation and associated infrastructure, agriculture and targeted livelihood enhancement, and sustainable O&M through Water Users Strengthening of policies, plans, and institutions for more responsive service delivery and impacts

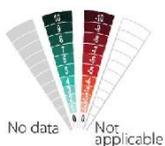


18	Improving dry season agriculture for marginal and tenant farmers in the Eastern Gangetic Plains	IMWI	Improve water use and increase dry season agricultural productivity among marginal and tenant farmers in the Eastern Gangetic Plains	Lack of awareness and limited access to information regarding climate risks and responses at farmer's level Institutional reform	Eastern Gangetic Plains, including the Nepal Tarai, Bihar and West Bengal regions	Identification of existing water resources and sustainable utilization for irrigation from tanks and groundwater Determination of socio-economic, structural and institutional constraints to sustainable water Analyses of water access for irrigation focusing on renewable technologies and alternate approaches to land tenure and their impact on livelihoods and resilience
<p>Sample Projects Related to Increasing Governance Capacity *Note: All of the above projects include components addressing capacity building. However, unlike the previous projects, the core priority of the following project is governance.</p>						
19	Local Governance and Community Development Programme	UNDP	Improve local governance for effective service delivery and citizen empowerment, especially women and disadvantaged groups	Institutional reform	Nationwide (75 Districts, 191 Municipalities and 3,276 Village Development Committees)	Citizen empowerment to actively engage with local governments Increase local government capacity to manage resources and deliver basic services in an inclusive and equitable manner

Annex H: Detailed smartness assessment for top ongoing CSA practices by production system as implemented in Nepal

Table 1. Detailed smartness assessment for top ongoing CSA practices by production system as implemented in Nepal.

CSA practice	Region and adoption rate (%)	Predominant farm scale S: small scale M: medium scale L: large scale	Climate smartness	Impact on CSA Pillars
Rice (31% of total harvested area)				
System of rice intensification with Alternate Wetting and Drying (AWD)	Rain-fed Terai <30%	M		Productivity Increments in yield due to the higher number of tillers and better grain quality. Adaptation Minimizes water use and increases water use efficiency for rice cultivation. Enables larger area for cultivation in areas with limited water availability. Mitigation Reduced methane emission from rice fields.
	Irrigated Terai <30%	M		
Irrigation at critical time (solar-based)	Rain-fed Terai <30%	S M		Productivity Increases in productivity and income through system intensification. Adaptation Provides irrigation during critical periods (e.g. tillering and flowering). Makes water available for timely nursery establishment during dry summer. Mitigation Reduces GHG emission by replacing diesel pumps.
	Irrigated Terai <30%	M		
Maize (18% of total harvested area)				
Crop intensification (legume intercropping, terracing)	Mid-hill <30%	S M		Productivity Higher profits due to increased yield and reduced cost. Adaptation Use of residual moisture for sowing, allows 15 day early sowing to avoid terminal heat in late winter. Residues helps to retain soil moisture. Mitigation Reduces GHG emissions by reducing fuel and energy use. Promotes conservation of SOM.
Conservation agriculture (minimum tillage, cover crop, intercropping)	Mid-hill <30%	S M		Productivity Higher profits due to increased crop yields and reduced production costs. Adaptation Increases moisture retention due to mulching and cover crops, reduces soil erosion caused by heavy downpours. Mitigation Reduces fuel requirements for tillage. Mulching and cover crops increase soil carbon capture and Soil Organic Matter (SOM).



 Yield

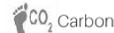
 Income

 Water

 Soil

 Risk/Information

 Energy

 Carbon

 Nutrient

CSA practice	Region and adoption rate (%)	Predominant farm scale S: small scale M: medium scale L: large scale	Climate smartness	Impact on CSA Pillars
Maize (18% of total harvested area)				
Conservation agriculture (minimum tillage, cover crop, intercropping)	Terrai <30%	M		<p>Productivity Higher profits due to increased crop yields and reduced production costs.</p> <p>Adaptation Increases moisture retention due to mulching and cover crops, reduces soil erosion caused by heavy downpours.</p> <p>Mitigation Reduces fuel requirements for tillage. Mulching and cover crops increase soil carbon capture and Soil Organic Matter (SOM).</p>
Wheat (15% of total harvested area)				
Conservation agriculture (zero/minimum tillage, mulching)	Rain-fed Terai <30%	M		<p>Productivity Higher profits due to increased yield and reduced cost.</p> <p>Adaptation Use of residual moisture for sowing, allows 15 day early sowing to avoid terminal heat in late winter. Residues helps to retain soil moisture.</p> <p>Mitigation Reduces GHG emissions by reducing fuel and energy use. Promotes conservation of SOM.</p>
	Irrigated Terai <30%	M		
Mixed cropping with leguminous species and mustard	Rain-fed Terai <30%	S M		<p>Productivity Increases total production and productivity per unit of land. Harvests of multiple crops increase income and food security.</p> <p>Adaptation Reduces the risk of total crop failure under unfavorable conditions, due to crop diversification.</p> <p>Mitigation Ensures long-term soil cover and conserves SOM. Legume integration increases soil Nitrogen, reducing use of synthetic fertilizer.</p>
	Irrigated Terai <30%	S		
Vegetables (beans, cabbage and other brassicas) (5% of total harvested area)				
Micro-irrigation (drip irrigation, sprinkle)	Terrai <30%	S		<p>Productivity Increases in yield due to appropriate water management.</p> <p>Adaptation Increases availability of water. Minimizes water use per unit of production, increasing water use efficiency.</p> <p>Mitigation Reduces energy required for irrigation.</p>

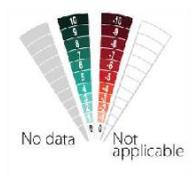
CSA practice	Region and adoption rate (%) <30 30-60 60>	Predominant farm scale S: small scale M: medium scale L: large scale	Climate smartness	Impact on CSA Pillars
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Vegetables (beans, cabbage and other brassicas) (5% of total harvested area)

Micro-irrigation (drip irrigation, sprinkle)	Mid-hill <30%	M		<p>Productivity Increases in yield due to appropriate water management.</p> <p>Adaptation Increases availability of water. Minimizes water use per unit of production, increasing water use efficiency.</p> <p>Mitigation Reduces energy required for irrigation.</p>
Waste-water collection and rainwater harvesting	Mid-hill <30%	S		<p>Productivity Increases in yield, income and household nutrition by enabling vegetable growing in extremely dry areas.</p> <p>Adaptation Increases water availability for crop production during water scarcity.</p> <p>Mitigation Reduces GHG emissions due to reduced fuel required for pumping and/or carrying water.</p>
	Terai <30%	S		

Lentil (4% of total harvested area)

Zero tillage seeding for relay cropping	Irrigated terai >60%	M		<p>Productivity Promotes higher yield due to escape of terminal heat. Reduces production costs increasing profit.</p> <p>Adaptation Allows seed sowing even under water scarcity conditions. Allows early sowing, helping to escape terminal heat.</p> <p>Mitigation Protects soil structure and organic carbon reserves. Promotes fuel and energy saving due to reduced tillage.</p>
	Rainfed terai 30-60%	M		
Mixed cropping with mustard or wheat	Rain-fed Terai 30-60%	S		<p>Productivity Increases in income due to harvesting of multiple crops.</p> <p>Adaptation Reduces risk of complete crop failure. Allows optimum use of scarce water resources.</p> <p>Mitigation Increases above- and below-ground biomass and carbon capture compared to mono-cropping.</p>



Yield



Income



Water



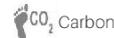
Soil



Risk/Information



Energy



Carbon



Nutrient

CSA practice	Region and adoption rate (%)	Predominant farm scale S: small scale M: medium scale L: large scale	Climate smartness	Impact on CSA Pillars
Lentil (4% of total harvested area)				
Zero tillage seeding for relay cropping	Irrigated terai 30-60%	S		<p>Productivity Increases in income due to harvesting of multiple crops.</p> <p>Adaptation Reduces risk of complete crop failure. Allows optimum use of scarce water resources.</p> <p>Mitigation Increases above- and below-ground biomass and carbon capture compared to mono-cropping.</p>
Potato (4% of total harvested area)				
Integrated pest management	Terai <30%	S		<p>Productivity Ensures crop production and quality, hence potential increases in income.</p> <p>Adaptation Reduces crop losses due to red ants, even during moisture stress conditions.</p> <p>Mitigation Reduces GHG emissions by reducing use of synthetic pesticides.</p>
	High hills/ Mountains <30%	S		
Appropriate planting method (flat bed in dry, ridge-furrow in wet)	High hills/ Mountains 30-60%	M L		<p>Productivity Increases in yield and profit due to reduced production costs.</p> <p>Adaptation Optimizes the use of available soil moisture to avoid crop loss. Increases water use efficiency.</p> <p>Mitigation Reduces energy required for irrigation contributing to reduction in related GHG emissions.</p>
	Terai 30-60%	S M		
Mustard (4% of total harvested area)				
Zero-tillage sowing	Rain-fed Terai <30%	S		<p>Productivity Promotes higher yield due to escape of terminal heat. Reduces production costs, increasing profit.</p> <p>Adaptation Allows seed sowing even under water scarcity conditions. Allows early sowing helping to escape terminal heat. Maintains soil moisture in dry season.</p> <p>Mitigation Protects soil structure and organic carbon reserves. Promotes fuel and energy savings due to reduced tillage.</p>

CSA practice	Region and adoption rate (%)	Predominant farm scale S: small scale M: medium scale L: large scale	Climate smartness	Impact on CSA Pillars
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Mustard (4% of total harvested area)

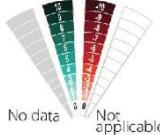
Zero-tillage sowing	Irrigated Terai <30%	S M		<p>Productivity Promotes higher yield due to escape of terminal heat. Reduces production costs, increasing profit.</p> <p>Adaptation Allows seed sowing even under water scarcity conditions. Allows early sowing helping to escape terminal heat. Maintains soil moisture in dry season.</p> <p>Mitigation Protects soil structure and organic carbon reserves. Promotes fuel and energy savings due to reduced tillage.</p>
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Supplementary pollination (integration with beekeeping)	Rain-fed Terai <30%	M L		<p>Productivity Increases crop yield due to greater pollination.</p> <p>Adaptation Copes against the reduced numbers of pollinators (including honey bee) due to erratic weather patterns and human influence.</p> <p>Mitigation Reduces the use of synthetic agro-chemicals, reducing the carbon footprint per unit of production.</p>
	Irrigated Terai <30%	M L		

Sugar cane (1% of total harvested area)

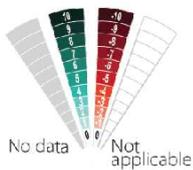
Ratoon management (minimum soil disturbance)	Rain-fed Terai <30%	S M		<p>Productivity Reduces production costs, increases income.</p> <p>Adaptation Minimizes soil disturbance, maximizing moisture availability. Ratoons are more adaptive to climatic stresses.</p> <p>Mitigation Less fuel required for tillage thereby reducing GHG related emissions. Reduces water pumping/transport requirements.</p>
	Irrigated Terai 30-60%	S M		

Intercropping (autumn: lentil; spring: mung bean)	Rain-fed Terai <30%	S		<p>Productivity Increases in household income and profit due to harvesting of multiple crops.</p> <p>Adaptation Integration of legume crop diversifies the production system, hence reduces risk of complete crop failure.</p> <p>Mitigation Reduce requirement of synthetic Nitrogen-based fertilizers, reducing nitrous oxide emissions.</p>
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	 Yield  Income  Water  Soil  Risk/Information  Energy  CO ₂ Carbon  Nutrient
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CSA practice	Region and adoption rate (%)	Predominant farm scale S: small scale M: medium scale L: large scale	Climate smartness	Impact on CSA Pillars
Sugar cane (1% of total harvested area)				
Intercropping (autumn: lentil; spring: mung bean)	Irrigated terai <30%	S		<p>Productivity Increases in household income and profit due to harvesting of multiple crops.</p> <p>Adaptation Integration of legume crop diversifies the production system, hence reduces risk of complete crop failure.</p> <p>Mitigation Reduce requirement of synthetic Nitrogen-based fertilizers, reducing nitrous oxide emissions.</p>
Cow and buffalo (milk) (NA)				
Stall feeding combined with biogas plant	Terai <30%	S M		<p>Productivity Increases in production due to balanced/optimum nutrition. Reduces household expenditure on energy.</p> <p>Adaptation Reduces animal's stress during extreme climatic conditions by reducing exposure. Biogas reduces pressure on timber from forest.</p> <p>Mitigation Reduces pressure on grazing land and forests contributing to its preservation and promoting carbon capture.</p>
	Mid-hill 30-60%	S		
Improved farm yard manure (FYM) management	Terai 30-60%	S		<p>Productivity Reduces cost of production and increases profit from livestock and agriculture.</p> <p>Adaptation Improves soil health by increasing organic matter content and microbial activities. Increases possibility of farming in degraded soils (e.g. top soil erosion).</p> <p>Mitigation Reduces GHG emissions by reducing use of synthetic fertilizers.</p>
	Mid-hill <30%	S		
Goat (meat) (NA)				
Improved goat-sheds	High-hill <30%	S		<p>Productivity Faster growth and higher feed conversion ratio due to proper housing.</p> <p>Adaptation Reduces exposure to adverse climatic conditions, reducing animal stresses (e.g. cold waves).</p> <p>Mitigation Allows better manure management, thereby reducing related GHG emissions.</p>

CSA practice	Region and adoption rate (%)	Predominant farm scale S: small scale M: medium scale L: large scale	Climate smartness	Impact on CSA Pillars
Goat (meat) (NA)				
Improved goat-sheds	Mid-hill <30%	S		<p>Productivity Faster growth and higher feed conversion ratio due to proper housing.</p> <p>Adaptation Enhances soil moisture and fertility. Reduces soil erosion and increases biodiversity.</p> <p>Mitigation Increases carbon storage in soils. Reduces use of synthetic fertilizers and related GHG emissions.</p>
Reduce inbreeding by providing new bucks	High-hill <30%	S		<p>Productivity Reduces loss of assets and income from livestock, thereby increasing household profits.</p> <p>Adaptation Reduces the risk to extreme climate conditions without compromising production and quality.</p> <p>Mitigation Reduces fodder/forage required for attaining maximum yield. Reduces pressure on natural resources and related GHG emissions.</p>
	Mid-hill 30-60%	S		



Yield



Income



Water



Soil



Risk/Information



Energy



CO₂ Carbon



N₂O Nutrient

Annex I: Institutional Arrangement for Implementation of CRA Project

Level of governance	Related agencies under various level of governance and steering mechanisms	Steering mechanism of CRA	Support services from FAO/GCF
Federal (Central)	Ministry of Agriculture, Cooperatives, and Land Management Ministry of Forests, Science and Environment Ministry of Finance and Planning, Ministry of Water Resources and Energy, National Planning Commission Research and academic institutions Private sector Farmers groups representatives, and Indigenous and ethnic groups representatives	Project Steering Committee (PSC)	National Project Support Unit
Provincial (State)	Ministry of Agriculture, Cooperative and Land Management Ministry of Forests, Science and Environment Ministry of Finance and Planning, Ministry of Water Resources and Energy, Civil society organisations, Private sector, Users group representatives, Indigenous and ethnic groups, and Research and academic institutions	Project Coordination Unit (PCU)	Provincial Project Support Unit
Local (Municipal)	Target Municipalities Target wards Municipality (Rural) Civil society organisations, Private sector representative User group representatives, Community based organisations Frontline officers from relevant ministries, Indigenous and ethnic groups, and Research and academic institutions	Municipal Project Support Unit (MSU)	Local Project Support Unit

Annex J: Key Commodities - CRA Target Districts

District	Five main crops (as per area under cultivation)	Area under cultivation (Hectares)	Production (Metric Tons)	Yield (kg/hectare)
Udaypur	Paddy	11,500	40,958	3,562
	Maize	10,388	35,123	3,381
	Oilseed	5,209	4,204	807
	Wheat	5,100	12,240	2,400
	Mustard	3,987	3,311	830
Sunsari	Paddy	44,900	15,5110	3,455
	Wheat	14,500	44,800	3,090
	Oilseed	9,390	15,434	1,644
	Maize	8,350	25,100	3,006
	Lentils	6,836	7,870	1,151
Saptari	Paddy	31,900	82,250	2,578
	Wheat	17,000	41,000	2,412
	Lentils	7,590	8,550	1,126
	Potato	5,570	69,380	12,456
	Oilseed	4,277	3,303	772
Dolakha	Maize	5,500	12,650	2,300
	Potato	4,500	59,000	13,111
	Wheat	4,230	6,979	1,650
	Millets	3,600	4,250	1,181
	Paddy	3,090	6,500	2,104
Ramechhap	Maize	19,345	48,462	2,505
	Paddy	9,020	21,654	2,401
	Millets	5,060	5,100	1,008
	Wheat	3,852	8,089	2,100
	Potato	3,341	38,475	11,516
Sindhuli	Maize	23,620	58,500	2,477
	Paddy	13,265	35,900	2,706
	Millets	11,700	11,880	1,015
	Wheat	5,650	14,125	2,500
	Oilseed	5,274	4,664	884

Source: Statistical Information on Nepalese Agriculture 2072/73 (2015/16)

Number of key livestock species raised in selected districts indicating high of exposure

District	Cattle	Buffaloes	Goat	Fowl	Sheep	Pigs	Yak/nak/ Chauri
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Dolakha	81,777	52,293	155,992	374,798	11,809	12,436	5,053
Ramechhap	85,972	68,391	163,509	395,816	3,763	16,699	1,653
Udayapur	115,562	99,007	246,617	824,036	609	49,928	0
Sindhuli	125,775	61,822	225,080	569,000	315	22,376	0
Saptari	224,252	179,010	199,697	883,064	2,033	21,966	0
Sunsari	285,225	139,896	232,151	1,136,374	3,658	55,540	0

Source: CBS, 2016, *Statistical Agriculture Book, 2016*

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