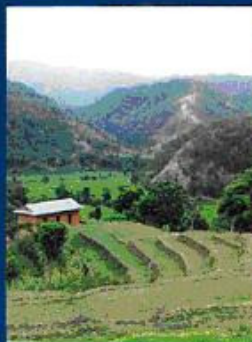


# Climate Change and Food Security

Managing climate risks and  
enhancing resilience



Ministry of Agriculture  
and Cooperatives, Nepal



Food and Agriculture Organization  
of the United Nations





### Crop Improvement for Drought and Flood Tolerance

Sustained efforts are crucial to strengthen research and development links. New crops and varieties developed at research stations that are better adapted to climate variability, including drought-tolerant varieties of wheat, maize, and rice are evaluated in farmers' fields in participation with local farmer groups.

Seven new drought tolerant and short duration wheat varieties were evaluated by Nepal Agriculture Research Council (NARC) and DoA in participation with local farmers in Arghakanchi district. Farmers identified suitable varieties for their location considering climate risks. Efforts are underway to supply seeds of preferred varieties to farmers' groups in the district.

Five promising drought tolerant rice varieties were compared with a local variety in Udayapur district. Gender related concerns were taken into consideration throughout the project, including promotion of new varieties.

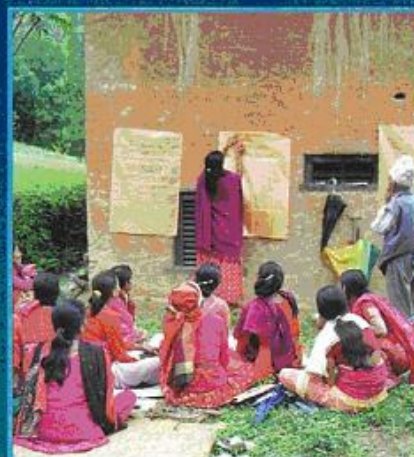


### Management of High/Low Temperature Stress

Managing climate variability and adaptation to climate change are location-specific solutions. Temperature records of Nepal for last 30 years indicate an increasing trend. Warming is more pronounced in the high and mid-hill regions of Nepal compared to Terai. Summer temperature exceeds the thresholds of crops and fluctuations in winter temperature causes occurrence of pest and diseases.

A localized tunnel-farming practice reduces temperature fluctuations and enhances opportunities for growing off-season vegetables. The structures are covered with locally available materials to provide shade, aeration and to protect young vegetable seedlings and conserve water during dry weather.

Occurrence of late blight of potato increases with cold temperature and abnormal temperature fluctuations. True Potato Seed (TPS) was found more tolerant to such abnormalities.



### Participatory Learning and Awareness-raising

The climate education approach promotes farmer participatory learning by doing. Climate knowledge of farmers improved through Farmer's Field School (FFS) and Forest User Groups to raise awareness on climate change and disaster risks. Climate education initiatives empower farmers to make appropriate decisions and adopt climate resilient technologies in a proactive way.

In total 25 farmer groups (include 4 women groups) are empowered through climate education initiatives with a focus on climate risk management. The farmer's group regularly assesses the risks and prioritizes the adaptation practices.

Farmers are provided with adaptation practices conditioned by climate information during the interactive sessions. Information bulletins and leaflets on location specific adaptation practices are distributed to the farmers to promote risk reduction actions.

## Background

Agriculture is Nepal's principal economic sector employing more than 70 percent of the population. The sector is highly exposed to a number of recurring natural disasters such as floods, drought, landslides, hailstorms, snow avalanches, Glacial Lake Outburst Floods (GLOF), hot and cold waves, and pest and disease epidemics. These natural disasters threaten livelihoods and cause severe economic losses for farmers.

Climate change further increases the frequency and intensity of extreme climate events and causes social, economic, and environmental impacts. This trend is expected

to continue during the current century due to continued greenhouse gas emissions. Even more harmful is the increased climate variability caused by climate change, which create temperature extremes, longer drought and flood periods. Climate change and variability will increase pressure on natural resources and will affect food security and rural livelihoods in Nepal.

Social and institutional factors contribute to the vulnerability of rural livelihoods to recurrent natural disasters and changing climate. Insufficient institutional support services, public awareness, inadequate

community preparedness and planning, lack of early warning systems, poor coordination, limited knowledge on local vulnerability and risks, and inadequate information dissemination to vulnerable communities will lead to weakened overall response to climate related risks. These issues are compounded by greater agriculture dependence, shrinking farm size and continued agriculture in hazard prone areas in Terai and mid-hill regions of Nepal.





## Soil and Water Conservation

Sustainable natural resource management practices at the individual and community levels need to be promoted and supported. Rainwater harvesting and slope protection measures reduce the risk of drought periods and soil erosion.

Community conservation ponds provide water for vegetables, crops, and livestock in Udayapur District. Community participation and sustained dialogue are central to success of sustainable natural resources management.

Small farmers in selected VDCs of Arghakanchi district are supported to practice sloping agricultural land technologies (SALT) to protect from soil erosion. Exposed soil on sloping land is replaced by well-constructed, vegetated terraces to reduce the land's slope and conserve soil, preserve nutrients, and increase soil moisture. Zero and minimum/resource conservation tillage for wheat planting in rice-wheat system saves 30% water and improves soil physical properties and enhances fertilizer more efficiently.



## Strengthen Agriculture Support Services

Institutional and technical capacity building for effective management of climate risks is the key. A series of local and national level training programmes are conducted for agriculture service providers. Local capacity building efforts are combined with multi-stakeholder dialogue and local consultations for preparation of district risk management plans.

Agriculture support services related to locally relevant community centered seed storage systems and dissemination of climate resilient technology are considered important.

Existing data gaps analyzed and improved data collection and monitoring methods proposed to better plan disaster risk management and climate change adaptation practices in agriculture. A collaborative effort was made to upgrade the meteorological instruments to ensure better monitoring of weather and evaluate risk reduction measures.



## Restoration of Degraded Community Resources

There is a need to enhance the opportunities for adaptation-mitigation synergies in agriculture. Restoration of forest and communal land areas affected by landslides, gully, and river bank cutting is promoted through climate-appropriate fodder grasses and tree species together with risk reduction measures. Forest user groups (FUGs), which operate community forestry (CF) activities are closely engaged.

Landslides have the potential to cause slippage that threatens fertile agricultural land on top of the ridge if it is not properly stabilized. The FUGs are supported to prepare site specific plans that reflect local vulnerabilities, leading to forest protection and effective management of the forest.

Farmers in Kapilbastu district prioritized river bank cutting as a priority risk. Both living (fodder/forage grass and bamboo plantations) and nonliving (rocks, boulders) measures are planned to mitigate the floods and to stabilize points of erosion.

## FAO's support

With a view to manage the climate risks and adapt food systems to climate change, the Government of Nepal and the Food and Agriculture Organization of the United Nations (FAO) launched a technical cooperation program (TCP) on "Strengthening Capacities for Disaster Preparedness and Climate Risk Management in Agricultural Sector" (TCP/NEP 3201 (D)) in two development regions. Later, UNDP and FAO joined together to expand the initiative to an additional development region. This initiative supports the Government of Nepal at the national, district, and village development committee (VDC) levels in launching a climate

risk management approach to address disaster preparedness and climate change adaptation in agricultural sector. The major elements of the technical support include:

### Improved mechanisms for climate risk management

- Improving institutional and technical capacity for climate risk management and disaster preparedness.
- Preparing a national-level Plan of Action (PoA) for the Ministry of Agriculture and Cooperatives (MoAC) on disaster preparedness and climate change adaptation.

- Facilitating to integrate agriculture and food security perspectives into Nepal's National Adaptation Programme of Action (NAPA).

### Strengthened agriculture service systems

- Preparing District Risk Reduction Plans based on the local vulnerability and risks
- Collecting and analyzing climate impact data, monitoring and analysis.
- Demonstrating location-specific technologies for climate risk management at the community level.
- Designing extension and awareness strategies at community-level.





## Pilot Locations

FAO is assisting the Ministry of Agriculture and Cooperatives (MoAC) implementing the initiatives in four districts in Nepal (Siraha, Udayapur, Kapilbastu, and Arghakhanchi). UNDP supports expansion of this initiative to additional two districts (Banke and Surkhet) (Figure).

These districts represent the Terai, Siwalik and Mid-hill landscape types in Nepal, which will allow for replication of the local level activities in other similar districts in Nepal. The three district clusters are:

- Eastern Development region — Siraha and Udayapur
- Western Development region — Kapilbastu and Arghakhanchi
- Mid-western Development region — Banke and Surkhet

## Partners

- United Nations Development Programme (UNDP), Nepal
- Ministry of Agriculture and Cooperatives (MoAC)
- Department of Agriculture (DoA)
- Department of Livestock Services (DoLS)
- Nepal Agricultural Research Council (NARC)
- Department of Hydrology and Meteorology (DHM)
- Ministry of Environment, Science and Technology (MoEST)
- Practical Action (PA)
- Nepal Development Research Institute (NDRI)



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