



Ministry of Natural Resources and  
Environmental Conservation



Myanmar  
Climate  
Change  
Alliance

# Climate-smart agriculture, fisheries and livestock for food security

Policy Guidance Brief 1

October 2017



The Myanmar Climate Change Strategy & Action Plan (MCCSAP) is a 15-year road map of Myanmar's strategic response to climate-related risks. MCCSAP aims to increase the adaptive capacity of the country and maximise opportunities for low-carbon and climate-resilient development. To achieve this, the Strategy is intended to guide investments in six key development sectors including: (i) agriculture, fisheries and livestock; (ii) environment and natural resources; (iii) energy, transport and industry; (iv) urban development; (v) health and disaster risk reduction; and (vi) education, public awareness and technology.

This Guidance Brief is one of a series produced by the Myanmar Climate Change Alliance (MCCA) to help develop understanding on key sectoral challenges, strategic objectives and specific actions to effectively address climate change in Myanmar. The series aim at providing high-level policy guidance designed for use by the Members of the six sectoral Working Groups on MCCSAP. In addition, the briefs seek to raise awareness of various stakeholders on the national priorities of action in the field of climate change.

## Key Points

- The agriculture sector (including livestock and fisheries) constitutes about 28 per cent of Myanmar's gross domestic product and 61 per cent of the total employment. Moreover, 70 per cent of Myanmar's population still lives in rural areas and remains highly dependent on small-scale agriculture (crops, livestock, fishing). Rural poor suffer insufficient access to food and nutrition.
- Climate change has already challenged the agriculture sector in Myanmar by affecting rice yields and livestock production, while disasters such as floods and cyclones have caused massive destruction in rural areas.
- Without adaptation, the long-term consequences of climate change will likely include reduced productivity and huge economic losses, food insecurity, poverty and migration.
- There is an urgent need of further action to promote sustainable agriculture. This requires adapting crop varieties and corresponding farming practices, improving water management especially in rice production, reducing greenhouse gas emissions from rice and livestock farming, promoting integrated farming systems and enhancing the capacity of farmers to respond to climate risks.
- In the long-term, sectoral policy responses should seek to establish productive, climate-smart farming systems and improve farmers' livelihoods. Enhancing the resilience to climate change of agriculture has already been prioritized in the National Adaptation Programme of Action.
- According to the Climate Change Action Plan for the Agriculture, Fisheries and Livestock sector, by 2030 Myanmar should achieve climate-resilient productivity and promote climate-smart responses to support food security and livelihood strategies while also introducing resource-efficient and low-carbon practices.
- The expected results to achieve this outcome are: (i) integrated climate change into relevant policies, planning and budgeting procedures and have put these into practice, taking into account gender considerations; (ii) adopted climate-resilient and environmentally sound adaptation technologies and climate-smart management practices, supported by international and domestic finance; (iii) established institutional coordination and multi-stakeholder engagement framework.





## Why is the agriculture sector of strategic importance for the sustainable development of Myanmar?

*Myanmar's agriculture, fisheries and livestock sectors contribute significantly to the national economic growth, poverty reduction and food security.*

Agriculture constitutes about 28 per cent of the country's gross domestic product, 61 per cent of the total employment and 16 per cent of the total export earnings (MoALI, 2015; MoNREC, 2017). Almost two-thirds of the cultivated land is used for rice production, and one-third for beans and pulses (both leading export crops); other crops include oilseeds, vegetables, chilies, maize, cotton, rubber, sugarcane and tropical fruit (MoNREC, 2017). The crop production in Myanmar is mostly rain-fed, which makes it sensitive to variations in rainfall. Fisheries sector accounts for about ten per cent of the national output and employs more than five per cent of the total population. Livestock production is dominated by backyard cattle, buffalo, pigs and poultry farming.

The agriculture, fisheries and livestock sectors are characterized by a small-scale production and remain the main source of livelihood in rural regions where 70 per cent of Myanmar's population lives. About 85 per cent of those living below the poverty line reside in rural areas (MoNREC, 2017). Although

Myanmar is a net food exporter, the rural poor (about 35-53 per cent of the rural population) face high food and nutrition insecurity (MoALI, 2015).

*In future, Myanmar will have to meet a growing demand for nutritious food, while securing export revenues from the agriculture sector. This means a growing pressure on land, water, forest and marine resources.*

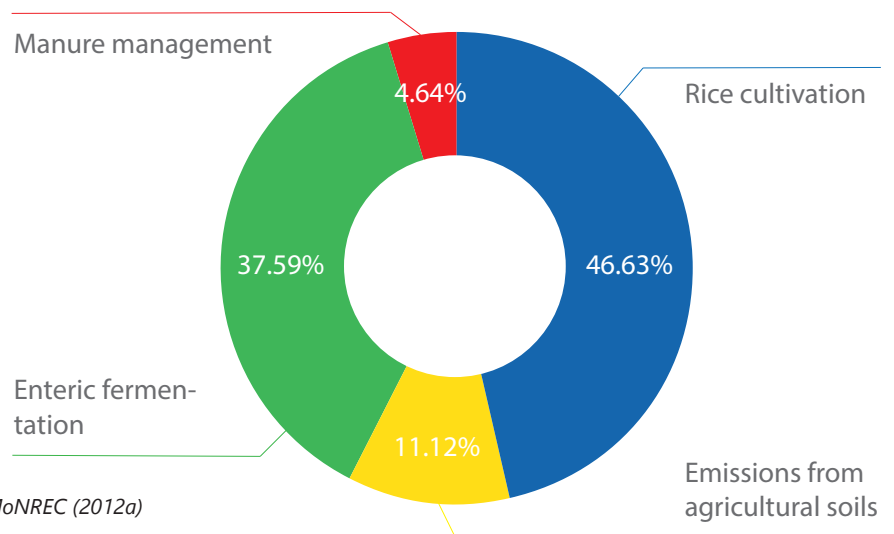
Unsustainable land use management and poor farming practices have already affected the health of vital ecosystems and reduced land productivity (MoNREC, 2012b). For instance, farmers often overuse chemical fertilizers and pesticides to optimize their production, which results in pollution of soil and water resources. Furthermore, the expansion of agricultural and temporary cropped areas is a primary cause of deforestation in Myanmar. Over the period 1990-2011, the agricultural fields increased by 7.73 million hectares (ADB, 2015).

The health and productivity of coastal ecosystems have also been affected by human activities such as over exploitation of mangrove forests for timber and fuelwood, industrial shrimp farming, as well as pollution from agriculture, industries and human settlements (MoNREC, 2012b).

Agriculture sector accounts for approximately 70 per cent of the total freshwater consumption (MoNREC, 2012b). While the country has abundant water resources, the water demand is growing and water availability significantly varies between wet and dry seasons. Current plans for development of irrigation infrastructure will put additional stress on

## Total greenhouse gas emissions from agriculture in 2000 (CO<sub>2</sub> eq\*), by source

\* Equivalent carbon dioxide



Source: Figures obtained from MoNREC (2012a)

### Myanmar's water resources.

Over the last 20 years, fisheries catches have increased dramatically due to a growing foreign demand (ADB, 2015). The use of traditional fishing practices has mitigated the effects on the environment. However, as the fishing sector is developing and attracting technological innovations, the pressure on fish stocks may increase.

*The agriculture sector is the major source of methane (CH<sub>4</sub>) emissions in the country, accounting for 31 per cent of the total greenhouse gas emissions in 2000.*

In 2000, agriculture and livestock production contributed 18 per cent and 13 per cent, respectively, to the total greenhouse gas emissions in Myanmar (MoNREC, 2012a). The greenhouse gas releases from agriculture originated from rice cultivation (81 per cent) and soil management (19 per cent). The CH<sub>4</sub> accumulated from irrigated rice production accounted for 44 per cent of the total CH<sub>4</sub> emissions from rice fields. Most livestock emissions of CH<sub>4</sub> were produced from enteric fermentation (89 per cent), particularly from cattle and buffalos, but also from manure management (11 per cent).

*Recent trends reveal that emissions from agriculture are continuously growing due to expansion of agricultural land, rising use of fertilizers and increasing livestock production.*

## What are the impacts of climate change on agriculture, fisheries and livestock?

*Increasing temperatures and erratic rainfall, combined with frequent occurrence of droughts and floods, will likely result in a loss of agricultural productivity, including short-term crop failures and livestock losses, and long-term production declines.*

Droughts and change in rainfall patterns will affect the rice production, 80 per cent of which is rain-fed. Increasing temperatures and prolonged dry conditions may lead to a higher demand for irrigation that could put water and land resources under growing pressure. Furthermore, extreme heat and change in moisture may bring negative impacts on rice and wheat yields, and increase the risk of significant losses due to plant pests and diseases (MoNREC, 2012b). Strong winds, heavy rainfall, droughts and floods will increase the risk of soil erosion in many agricultural regions.

Cyclones, sea level rise, floods and droughts may lead to severe animal feed and water shortages, as well as diseases, and consequent loss of livestock. This suggests a loss of essential food and income security

asset for many rural households. For example, past extreme drought and flooding events that affected the Central Dry Zone have caused animal feed shortage and consequent local productivity decline (MoNREC, 2017). Moreover, stored seeds and grain could be damaged by hazards such as floods and diseases, which would threaten the food security of entire communities.

*In future, parts of inhabited and productive coastal areas could become permanently inundated, while others could be affected by intrusion of saltwater into groundwater systems, soil salinization and coastal erosion processes.*

For instance, a stakeholder consultation revealed that in the Ayeyawady Delta every two years around two million hectares of land are flooded and more than three million hectares are moderately inundated (MoNREC, 2017).



"I take care of 20 goats for their owner. ... for three months during the year, when there's the drought, it's difficult to have enough feed for the goats because the earth gets so dry. I managed to earn enough money for a year as a farmer but then the drought got more severe. For a couple of years after 2003 it was really hard to put food on the table."

*Credit: MCCA/UN-Habitat (2016)*

## FUTURE CLIMATE IN MYANMAR AND IMPACTS ON AGRICULTURE, FISHERIES AND LIVESTOCK SECTOR

Increasing average temperatures and heat extremes and higher water demand for irrigation



Sea level rise



Erratic rainfall - periods of heavy and intense rains followed by long-lasting dry spells - leading to a loss of agricultural productivity.

Impacts on rice production and high economic losses due to natural disasters that are growing more frequent and intense with the global warming.

Changes in seasonal weather patterns and shortened monsoon periods will affect cropping cycles.

Insecure access to water for crops and livestock, and loss of ecosystem services.

Increasing risk of coastal hazards - coastal flooding, storm surges, strong winds and cyclones - and salinization of land and water resources in low-lying coastal areas.

Note: The provided values for increase in temperatures and sea level refer to projections with base period 1980-2005 and 2000-2004, respectively.

Summarized from: Horton R. et al., 2016; MNREC, 2012; MNREC, 2017.



Credit: MCCA (2017). "The Rising Tide" film, Yangon Film School

"We started to see the effects of climate change around the year 2000. The temperatures are so high during summer now. Rainfall patterns are changing too. Before, we could grow two crops a year but now we can only grow one crop because of limited rainfall during the pre-monsoon period... The monsoon used to come 45 days after Thingyan but now it comes much later and it ends sooner than it used to. The monsoon used to finish in October, but now it's the first week of September. This really affects us as farmers. Since July there's been a severe drought and this has lowered our farm yields. We just can't grow our crops like we used to and we worry a lot."

Coastal disasters are growing more frequent and intense with the global warming. The increasing number of coastal hazards has already brought enormous agricultural losses in low-lying coastal areas, including the Ayeyawady Delta (MoNREC, 2017). In 2008, Cyclone Nargis damaged four million hectares of rice (57 per cent of the country's total annual production), while floods in 2011 that affected Ayeyawady, Bago, Mon and Rakhine regions resulted in loss of around 1.7 million tons of rice.

Moreover, cyclones and tropical storms along the country's coastline, and floods along major rivers, will likely lead to a loss of fishing boats and assets, and damages to infrastructure. After major disasters, affected fishermen could lose their sole source of income.

Ocean warming and human activities have already affected fisheries worldwide, including in Myanmar. In future, the country's coastal ecosystems such as mangroves, coral reefs and sea-grass beds could be lost, leading to a sharp decline in fish and shrimp stocks and widespread poverty among coastal communities.

*Without adaptation, the long-term effects of climate change on agriculture, fisheries and livestock are likely to include migration, food insecurity, poverty and high intangible costs such as loss of*

### *traditional ways of living and impacts on human health.*

A decline in crop and livestock productivity could lead to an increase in food prices and threaten the food security of low-income families. Furthermore, climate change and recent disasters are new drivers of migration to cities and neighbouring countries. For example, changes in climate observed over the last 20 years in the Central Dry Zone affected crop productivity and conditioned migration to urban areas in Myanmar or to other countries (GoM, 2015). The loss of rural labour force may transform the traditional agriculture and challenge the socio-economic development of rural Myanmar.

*Climate change and migration of men are already forcing women to take central roles in agriculture and household food security. In future, rural women will play a critical role in building resilience to climate change in the agriculture sector.*

Socio-economic and environmental changes in rural Myanmar have a significant impact on women's well-being including challenges to secure household food, water and energy, and growing burden of unpaid care work. The capacity of rural women to adapt to climate change is further constrained by social norms and limited access to resources and skills. For instance, in many cases, women's contribution to the fisheries and agriculture sectors



“We used to plant twice a year. Now, because the rains come later, we can only plant once a year.... In the morning, I harvest sesame. In the afternoon, I sort beans. I can’t get any workers, I’m dying of exhaustion.”

is informal and, if paid for their labour, they receive lower wages than men.

## What is the current response to climate change?

Over recent years, Myanmar has developed a number of climate-related strategic documents for the agriculture sector. The National Strategy on Rural Development and Poverty Alleviation (2011) defines eight priority areas of action such as agriculture, livestock and fishery production, rural renewable energy and environmental conservation among others. The National Adaptation Programme of Action (2012) promotes climate-smart approaches, the use of climate-resilient varieties and crop diversification, as well as introduction of integrated/



“I’ve worked all morning for only one basket [of fish]. Not enough for petrol. How can we manage?”

*Credit: MCCA (2017). “The Rising Tide” film, Yangon Film School*

mixed farming systems for improved household food security.

The initiatives of the Ministry of Agriculture, Livestock and Irrigation (MoALI) are currently focused on implementing various climate change adaptation and mitigation measures such as soil and water conservation, introduction of stress-resistant crop varieties, improved pest and weed control, measures to reduce emissions from rice fields, and improved irrigation efficiency (MoALI, 2015).

The Climate-Smart Agriculture Strategy (2016-2030) aims at transforming Myanmar into “a climate-resilient, food, and nutrition, secure country, with a globally competitive agriculture sector attaining high productivity through climate-smart good agricultural practices resulting in a higher standard of living especially in the rural areas”. Adaptation programmes under the Strategy focus on: (i) crop and income loss risk management for improved farmers’ livelihood; (ii) disaster risk management to build resilience of farmers; (iii) adapting crop varieties and corresponding farming practices to enhance farmers’ adaptive capacities. Mitigation targets include reduced CH<sub>4</sub> emissions from rice fields and reduced land degradation and soil erosion through conservation agriculture.

## What is the required response?

Rapid-onset climate hazards and gradual environmental changes are already affecting Myanmar's agriculture sector and rural development. In future, the country will be challenged by increasing greenhouse gas emissions from agriculture and livestock, growing pressure on natural resources, and higher demand for food. Against this backdrop, Myanmar needs to promote resource-efficient and low-carbon practices, and build resilient farming systems.

Although the country has laid the foundations of climate change action in the agriculture sector, much more efforts are needed to move from planning to practice to achieve reduction of greenhouse gas emissions from rice production and livestock farming. Strategic climate change adaptation responses are also needed in the fishery and livestock sectors. Sector-specific policies and measures should focus on vulnerable groups living in climate-sensitive geographic areas such as rural

poor, landless families, women and marginalised people.

Overall, Myanmar could seek to:

- Integrate climate change into policies, plans and extension systems across agriculture-related sectors;
- Strengthen institutional coordination mechanisms and the capacity of various actors;
- Increase climate investment and strengthen the financing framework for climate-smart agriculture, livestock and fisheries;
- Promote climate-smart farming practices and improve access to adaptation and mitigation technologies, information and knowledge;
- Encourage multi-stakeholder partnerships to support implementation of climate change adaptation and mitigation activities (MoNREC, 2017).

## What is the climate change strategy for the agriculture sector?







The Government of Myanmar has recently formulated the Myanmar National Climate Change Policy, which is a high-level statement of the country's long-term vision and position on climate change.

*Myanmar's vision is to be a climate-resilient, low-carbon society that is sustainable, prosperous and inclusive, for the well-being of present and future generations.*

The Myanmar Climate Change Strategy and Action Plan (MCCSAP) 2016-2030 is the prime instrument for the implementation of the Climate Change Policy, which defines sectoral objectives and response actions.

The Climate Change Action Plan for the Agriculture, Fisheries and Livestock Sector aims at:

*Promoting climate-resilient productivity and climate-smart responses to support food security and livelihood strategies while also introducing resource-efficient and low-carbon practices.*

The set of proposed climate response for the agriculture, fisheries and livestock sectors are fully aligned with the priorities of the National Climate Smart Agriculture Strategy (2016), the National Adaptation Programme of Action and the Intended Nationally Determined Contribution.

The sectoral response rests on the following key principles embedded in MCCSAP:

- **Inclusive development** to include poor, landless, marginalised and vulnerable women and men to act as agents of change, and all geographic regions to shape and benefit from opportunities provided by climate-resilient and low-carbon development. The needs of vulnerable groups should be addressed to ensure inclusive development of the agriculture, fisheries, livestock and food security sector.
- **Integrated development** to direct government, development partners, civil society, private sector entities and communities to align, harmonise and coordinate policies and programmes to support the strategy's overall objectives.

# How does the Climate Change Action Plan for the Agriculture, Fisheries and Livestock Sector address the climate change vulnerability of Myanmar?

Potential impacts of climate change and sector-specific issues	Key vulnerability factors	Action Plan for the Agriculture, Fisheries and Livestock Sectors (expected results)	Indicators for monitoring progress
<p>Decline of yield in agriculture and fisheries, and reduced agricultural productivity in the long-term</p> <p>Increasing risk of slow- and rapid-onset disasters, and sea level rise, which can cause damages to crops and loss of livestock</p> <p>Direct impacts on crop productivity, especially in rain-fed areas</p> <p>Increased incidences of plant pests and diseases, and animal sickness</p> <p>Increased demand for irrigation, and increased drought risk</p> <p>Permanent inundation of agricultural land in coastal areas, and salinization of soil and water</p> <p>Loss of food and income security assets for rural households</p> <p>Low or negative economic growth in the sector, unemployment and migration</p>	<p>Growing emissions of CH<sub>4</sub></p> <p>Resource- intensive production, unsustainable agricultural practices and poor land use management</p> <p>Rural-urban migration, rural poverty and food insecurity</p> <p>High vulnerability of growing in number women-headed households in rural regions</p> <p>Increasing human pressure on water, land, forest and marine resources</p> <p>Limited capacities of farmers to respond and adapt farming practices to the growing climate challenges</p> <p>Low level of farmers' awareness on climate change</p>	<p>The agriculture, fisheries and livestock sectors have integrated climate change into their relevant policies, planning and budgeting procedures and have put these into practice, taking into account gender considerations.</p> <p>The agriculture, fisheries and livestock sectors have adopted climate-resilient and environmentally sound adaptation technologies and climate-smart management practices, supported by international and domestic finance.</p> <p>Institutional coordination and multi-stakeholder engagement framework have been established and support the implementation of climate-smart responses in the agricultural, fisheries and livestock sectors, including innovative business models and gender-sensitive approaches.</p>	<p># of sectoral policies, plans, research and development strategy and extension services that integrate climate change and are practiced at national, sub-national and local levels;</p> <p># of officials trained on sector-specific guidelines and tools for integrating climate change into planning and budgeting systems;</p> <p># of sectors, geographical areas, and technology-specific institutional arrangements, including a multi-stakeholder engagement framework developed to implement climate change responses at national, sub-national and local levels;</p> <p># of climate change adaptation projects implemented through externally supported finance and domestic resources;</p> <p># of climate-smart technologies and good practices introduced and scaled up in Central Dry Zone, the Ayeyawady Delta and Coastal Zone and lowland areas;</p> <p># of farmers (both men and women) benefiting from the introduction of climate-smart technologies and other responses;</p> <p># of multi-stakeholder partnerships that supported the scaling up of climate-resilient and low-carbon responses.</p>





## *Policies and legislation*

**Objective:** Integrate climate change into agriculture, fishery and livestock policies, plans, research and development, and extension services at national, sectoral and local levels

### **Activities:**

- Develop guidelines (tools, contents) to mainstream climate change into agriculture, fisheries, livestock and irrigation
- Pilot and promote inclusive and participatory adaptation planning at the local level to integrate climate change in local government, civil society organisations and community-based organisations agriculture and livelihood plans
- Develop climate change research and extension strategy for agriculture, fisheries and livestock sectors, including an action plan for climate-smart agriculture strategy
- Develop guidelines and action plan to mainstream gender in climate change-related policies of agriculture, fisheries, livestock and irrigation sectors
- Develop training modules for fisherfolk and farmers on how to integrate climate change into local-level planning
- Implement efficient water management practices in vulnerable townships and states, including mountainous and flood-prone areas, delta regions and the Dry Zone
- Implement eco-friendly crops and bio-energy schemes targeting climate vulnerable households in Shan state and the Dry Zone
- Identify and implement livelihood diversification activities (both on- and off- farm) in vulnerable areas of dry, delta, mountain and coastal areas, targeting poor and landless households
- Develop mitigation and low-carbon strategy, including plan for agriculture, fisheries and livestock sectors, in line with the Intended Nationally Determined Contribution and the National Climate Smart Agriculture Strategy
- Implement information and communication technology based monitoring system and retrofitting works in irrigation systems for effective water management by using geospatial



## *Institutions*

**Objective:** Establish and reinforce institutional arrangements to plan and implement climate change responses

### **Activities:**

- Establish national-level climate change and agriculture, fishery and livestock working groups to improve coordination and synergy
- Establish climate change cell or division within the Ministry of Agriculture, Livestock, and Irrigation (MoALI)
- Establish institutional platform to exchange learning and share knowledge on climate-smart agriculture, fisheries and livestock
- Develop terms of reference for climate change cell and human resource capacity to integrate climate change within MoALI
- Conduct gender analysis and develop capacity to integrate gender perspectives into climate change responses to agriculture
- Develop institutional guidelines and strategy for promoting decentralised community institutions for effective climate change response
- Establish and strengthen cooperatives or farmer, fisherfolk, water user, herder associations to collectively deal with climate change issues



## *Capacities*

**Objective:** Enhance awareness and capacity to promote and implement climate-resilient and low-carbon responses

### **Activities:**

- Establish climate change database management system at the MoALI
- Provide training to MoALI monitoring unit on approaches to improve climate risk analysis and related data monitoring and management
- Develop flood hazard maps in flood-prone areas to assess the agricultural damage
- Build capacity to develop national and regional

monitoring and surveillance plan for the fisheries sector

- Build capacity to establish more agro- and hydro-meteorological stations to strengthen weather and climate information
- Carry out trainings for farmers on using agro-met and hydro-met information
- Build capacity to carry out hydrological analysis in all flood-sensitive areas
- Carry out advanced trainings for hydrologic and hydraulic modelling with earth observation systems and; set up technical co-operation with international agencies
- Strengthen capacity to improve land use maps of vulnerable townships in the Dry Zone, delta and coastal areas
- Establish an agriculture information management system and agro-advisory mechanism for improving farmers' access to climate-relevant information
- Carry out climate change awareness-raising and capacity-building activities, targeting extension agents and government staff
- Provide climate change training for staff of academic and research institutions so they can generate climate-relevant information and knowledge
- Establish environment clubs or societies in schools and universities and support them to integrate climate change within their activities
- Develop farmer-friendly, gender-sensitive training and awareness-raising materials to address climate change
- Provide awareness and training on improved water, soil-nutrient, pest and disease management practices, with gender considerations
- Develop flood hazard map and carry out structural measures in flood-prone areas to assess agricultural damage



## Financing

**Objective:** Establish financial mechanisms to mobilise and allocate resources for climate change response and climate-responsive development

### Activities:

- Develop, integrate and legalise a risk-based insurance system to cover the loss and damage

of crops, livestock and fisheries due to climate-induced disasters

- Establish and promote microcredit cooperatives to increase access to financing for small enterprises, benefiting vulnerable households
- Develop budget guidelines and spending tracking system within MoALI to integrate climate change in annual budgeting
- Identify and promote financial incentive mechanisms — such as loans, microcredit and grants — targeting vulnerable households in Dry Zone and delta areas, with gender considerations based on gender analysis
- Integrate climate change economic and investment appraisal criteria — such as cost benefit analysis— into internal MoALI strategy and plans



## Technology and innovation

**Objective:** Increase access to climate-resilient and low-carbon technologies and practices

### Activities:

- Identify climate-smart agricultural technology and practices such as efficient and improved water management technologies that are suitable for dry, delta, mountain and coastal areas; prepare the extension materials
- Provide trainings to farmers and fisherfolk on climate-smart agriculture technologies and practices — such as improved soil and nutrient management, improved cropping and community aquaculture — with gender considerations and based on gender analysis
- Establish and promote climate-smart villages that focus on technology demonstration and generating climate change knowledge
- Carry out infrastructure design and studies to protect agricultural land in coastal and delta areas from salt water intrusion
- Implement dam instrumentation, hydro-meteorological monitoring and forecasting models for operating reservoirs in the context of climate change; and monitor reservoir areas using geospatial technologies
- Establish real-time hydro-meteorological monitoring and warning systems in the reservoir area using information and communication

- technology and geospatial technologies
- Develop and promote early maturing and heat tolerant rice varieties to cope with drought and water stress-in the Dry Zone, and delta and coastal areas
- Promote community-based seed bank in the Dry Zone to increase access to resilient seed and planting materials
- Promote stress-tolerant fish and livestock breeds, targeting vulnerable households in the Dry Zone, delta and coastal areas
- Establish early warning system, auto rain gauge, telemetry and auto water level monitoring system in the Lower Delta region
- Introduce low-emission farming technology and practices, targeting farmers in climate-impacted regions (Dry, Coastal, Delta and Hilly Zones, flood-prone areas), with gender considerations based on gender analysis
- Test and promote eco-friendly plans and bioenergy schemes in selected townships located in the Dry Zone
- Establish three pilot stations for climate change research (crop, fishery and livestock improvement research)
- Promote fuel-efficient agro-machineries, residue management and reduced tillage practices and technology



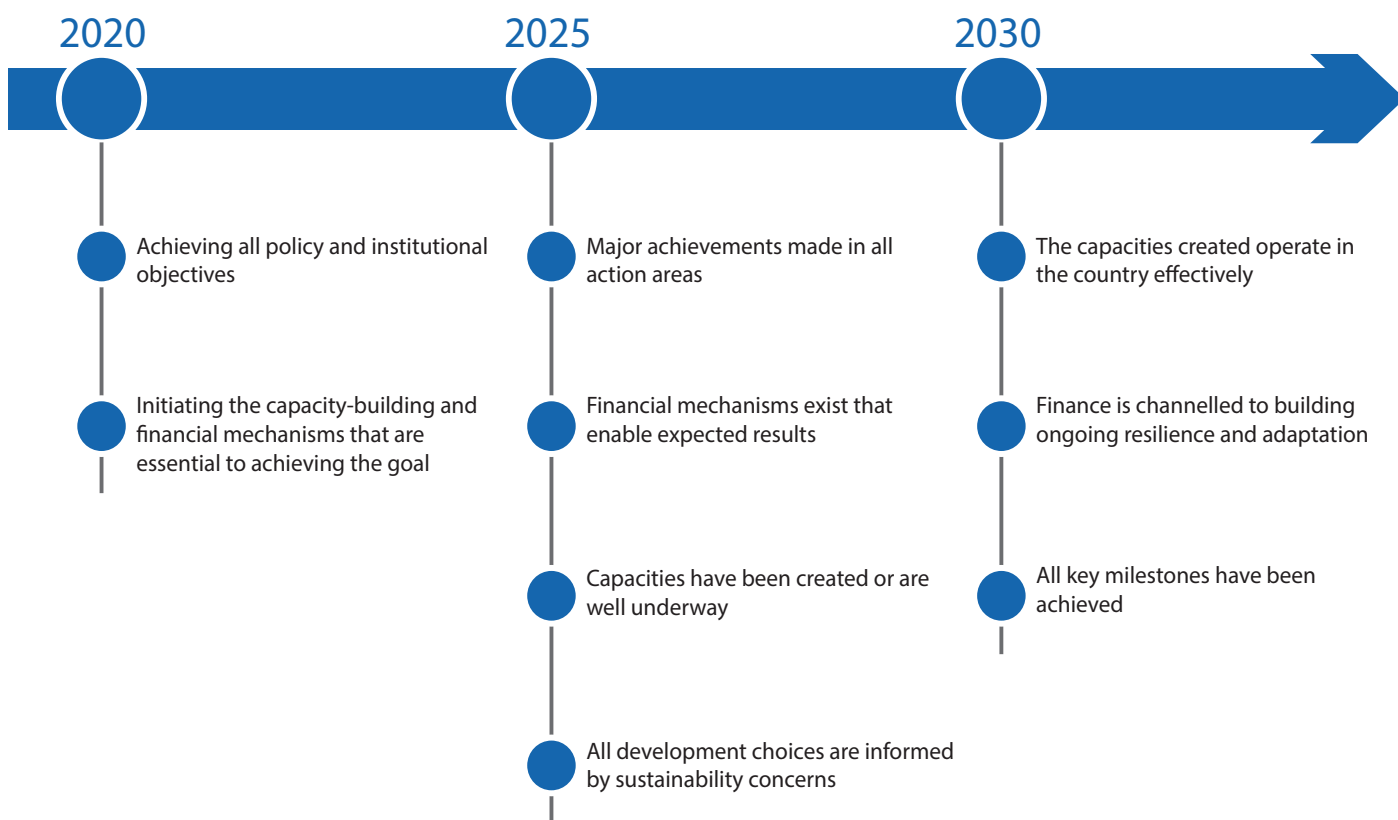
## Partnerships

**Objective:** Promote multi-stakeholder partnerships to support and scale up climate-resilient and low-carbon responses

### Activities:

- Establish national, regional, district and township-level multi-stakeholder climate change response committees
- Develop guidelines and regulations to enable private sector and other stakeholder investment on risk financing
- Develop collaborative projects targeting a third of the most vulnerable households in five states/regions on an annual basis
- Establish a national-level, multi-stakeholder engaged risk-based financing mechanism (loss and damage fund and modality) to support climate-vulnerable households

### Timeframe to achieve results



# How can the response to climate change within the agriculture, fisheries and livestock sectors bring sustainable development outcomes?

Building resilience of the agriculture, fisheries and livestock sectors can create jobs, secure income and help alleviate poverty in rural areas despite the challenges of climate change. If sectoral climate change policies address the needs and capacities of the poor, migrants and other vulnerable groups, they can reduce inequality.

Promoting climate-smart practices in agriculture can form a long-term pathway to achieve food security, preserve nature and bring multiple socio-economic benefits to rural communities such as improved well-being.

When climate change adaptation and mitigation

policies ensure conservation, restoration and sustainable use of land, water, forest and marine resources, communities will be able to benefit from ecosystem services in future.

Engaging the private sector to contribute to climate change adaptation and mitigation, and raising awareness of farmers on climate change and how to adapt their farming practices through climate-informed agricultural planning can help achieve sustainable consumption and production patterns within the sector.

Integrating gender consideration into sectoral policies and raising awareness of communities on the role of women in climate change adaptation and mitigation can help reduce gender inequalities.





## Women farmers in Nepal leading on climate-smart agriculture

Erratic rainfall and increasing temperatures are having high impact on the food and income security of rural communities in Nepal, where migration of men for economic opportunities has left many women behind to deal with these challenges. The film 'Farmers of the Future' – one of a series of the Climate&Development Knowledge Network (CDKN) Short films - shows how women farmers can take the leading role in implementation of climate-smart agriculture.

### Learn more:

[https://cdkn.org/2017/02/film-farmers-of-the-future-new-film-shows-nepals-women-farmers-leading-on-climate-smart-agriculture/?loclang=en\\_gb](https://cdkn.org/2017/02/film-farmers-of-the-future-new-film-shows-nepals-women-farmers-leading-on-climate-smart-agriculture/?loclang=en_gb)

## Climate change mitigation opportunities in the livestock sector

A report developed by the Food and Agriculture Organization of the United Nations (FAO) provides a comprehensive overview of feasible and efficient practices to reduce emissions from livestock production including case studies and implications for policy-making. The livestock species included in the assessment are large ruminants (cattle and buffalo), small ruminants (sheep and goats), and pigs and poultry.

### Learn more:

Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. & Tempio, G. (2013). Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations (FAO), Rome. Available at: [www.fao.org/3/i3437e.pdf](http://www.fao.org/3/i3437e.pdf).

## Climate-smart agriculture

The Consultative Group on International Agricultural Research (CGIAR) has established a knowledge-sharing platform 'Climate-Smart Technologies and Practices' under the research program on Climate Change, Agriculture and Food Security (CCAFS). Through a database of various projects, tools and stories from around the world, the flagship programme addresses the challenge of how to transition to a climate-smart agriculture.

### Learn more:

[www.ccafs.cgiar.org/flagships/climate-smart-technologies-and-practices](http://www.ccafs.cgiar.org/flagships/climate-smart-technologies-and-practices)



The Myanmar Climate Change Alliance (MCCA) was launched in 2013 to support the Government of the Union of the Republic of Myanmar in addressing the challenges posed by climate change. MCCA is an initiative of the Environmental Conservation Department (ECD) of the Ministry of Natural Resources and Environmental Conservation (MoNREC). It is funded by the European Union as part of the Global Climate Change Alliance (GCCA), and implemented by the United Nations Human Settlements Programme (UN-Habitat) in partnership with the United Nations Environment Programme (UN Environment). For more information: [www.myanmarccalliance.org](http://www.myanmarccalliance.org); Facebook: @myanmarccalliance.



#### Learn more:

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