

# CLIMATE CHANGE AND FOOD SECURITY

## Climate change will increase hunger and malnutrition

Climate change will worsen the living conditions of farmers, fishers and forest-dependent people who are already vulnerable and food insecure. Hunger and malnutrition will increase. Rural communities, particularly those living in already fragile environments, face an immediate and ever-growing risk of increased crop failure, loss of livestock, and reduced availability of marine, aquaculture and forest products. More frequent and more intense extreme weather events will have adverse impacts on food availability, accessibility, stability and utilization, as well as on livelihood assets and opportunities in both rural and urban areas. Poor people will be at risk of food insecurity due to loss of assets and lack of adequate insurance coverage. Rural people's ability to cope with climate change impacts depends on the existing cultural and policy context, as well as on socio-economic factors like gender, household composition, age, and the distribution of household assets.

## New patterns of pests and disease will emerge

Humans, plants, livestock and fish will be exposed to new pests and diseases that flourish only at specific temperatures and humidity. This will pose new risks for food security, food safety and human health.

## Fishing and aquaculture are threatened by climate change

Climate change is having an impact on oceans, seas, lakes and rivers and on the animals and plants that are found and/or cultured in them. Climate change will affect the approximately 200 million people and their families worldwide whose livelihoods depend on fishing and aquaculture. Some fish resources will become less abundant while important species may move to other areas where they are less available to the fishers. Aquaculture practices may be threatened, among other factors, by increased extreme weather events, droughts, and the warming of waters. This will make it harder for many fishing communities to continue to make a living from fish or to provide fish for feeding their families. Coastal communities may also be displaced

by rising sea levels and will be forced to find new places to live and new ways to earn a living.

## Agriculture contributes to climate change, but is also part of the solution

Greenhouse gas (GHG) emissions from the forest and agriculture sectors contribute over 30 percent of the current annual total emissions (deforestation and forest degradation 17.4 percent, agriculture 13.5 percent). Agriculture, however, can also contribute to reducing GHG emissions and their impacts through managing ecosystem services, reduction of land use change and related deforestation, more efficient crop varieties, better control of wildfires, improved nutrition for ruminant livestock, more efficient management of livestock waste, organic soil management, conservation agriculture and agroforestry systems. As well as reducing GHG emissions, well managed crop and pasture land can sequester significant amounts of carbon. Forty percent of the land biomass, and thus the biological carbon, are directly or indirectly managed by farmers, foresters or herders. It is in their interests to adopt management systems that combine mitigation and adaptation, thereby improving both local and global food security.

## Sustainable livestock management can reduce GHG emissions

Land used for livestock production, including grazing land and cropland dedicated to the production of feed, represents approximately 70 percent of all agricultural land in the world. Overgrazing is the greatest cause of degradation of grasslands. Improved land management practices would help to achieve a balance between competing demands for animal food products and environmental services. Improved pasture management and silvopastoral systems are effective ways to conserve the environment and mitigate climate change. Recent linking of pasture regeneration policies and programmes to no-till based integrated crop/pasture/livestock systems in Brazil appears promising for both farmers and the environment. Sustainable intensification and improved manure management are further options to reduce GHG emissions per unit of livestock product, and the use of biogas from animal waste can reduce dependence locally on fossil energy.

## Adapting to climate change

Disruption or decline in global and local food supplies due to climate change can be avoided through more efficient irrigation and watershed management, improved crop varieties, improved land cultivation, farm and livestock management and the development of crop varieties and breeds that are adapted to changing climatic conditions. An effective use of climate data and forecasts, through early warning systems, can assist in analysing the impacts of climate change on agricultural production and the entire food chain.

## Water is key

Raised productivity from improved agricultural water management will be essential to buffer the anticipated volatility of rainfed production. Managing the production risk in the face of increasing aridity and more variable rainfall events will require both rainfed and irrigated agricultural systems to become much more responsive and flexible in approach. Progressive adjustment of large-scale irrigation schemes will be essential to maintain and grow output in line with demand and improved local water management practices will allow vulnerable groups to adapt livelihoods.

## Soils hold significant climate change mitigation potential

The global soil carbon pool exceeds biomass pools by a factor of four or five, without taking into account that recent soil degradation has led to losses of between 30 percent and 75 percent of their antecedent soil organic carbon. Globally, therefore, a soil carbon increase offers great mitigation potential. The restoration of wastelands, degraded/desertified soils and ecosystems (e.g. forest restoration, improved pastures) and adoption of improved farm management practices, can enhance and restore soil organic carbon, control and reduce GHG emissions, and improve soil quality and soil health. Such management practices can at the same time improve food security as well as soil-related environmental services.

## Agricultural biodiversity

Agricultural biodiversity will be an important element in the development of production strategies to meet the challenges of climate change,

by increasing resilience to changing environmental conditions and stress (drought, salinity, flooding). Ecosystem services (such as genetic resources, soil formation or nutrient cycling) build important measures of resilience and risk mitigation into agriculture – elements that are increasingly important under changing climates.

## Adaptation and mitigation through sustainable forest management

Around 13 million hectares of forests are lost annually due to deforestation. Sustainable management of forests, reducing emissions from deforestation and forest degradation (REDD), afforestation/reforestation and forest restoration, as well as sustainably produced wood products that replace more carbon-intensive materials and fuels, are important mitigation options. Climate change is affecting the health of forests through an increase of forest fires, pests and diseases. Adaptation measures not only reduce the vulnerability of the world's forests and forest dependent people, but can help to protect water and soil resources and biodiversity. Without economic or other incentives and without political will, however, it will be difficult to reduce deforestation and forest degradation and achieve long-lasting adaptation and mitigation measures.

## Sustainable food production and climate change responses go hand in hand

Sustainable food production practices and climate change adaptation and mitigation strategies are mutually supportive. Many climate and weather risk management strategies fit squarely into sustainable agriculture and fisheries practices and can, therefore, be promoted through several of the programmes and policies targeting environmentally responsible production. Integration is a key feature for both practising and promoting sustainable food production and for developing climate change adaptation policies.