Agriculture, climate change, transitions:

What we believe:

Climate change challenges – both the slow increase in temperatures and the increased se-verity and frequency of extreme events – are already posing major challenges to food security in developing countries. By the end of the century, changes in temperature and rainfall, rising sea levels and an increase in the frequency of extreme climatic events will have had a considerable impact on agriculture. In a four-degree warmer world, vast areas of Africa will have more than 20% reductions in their growing season. Droughts, floods, unreliable seasons and unseasonable weather are already impacting farming operations.

Adaptation

In order to achieve food security, climate change adaptation is crucial, from now. Developing countries contribute the least to the global emissions of greenhouse gas and yet they are the most vulnerable to their impacts, mainly because of their high dependence on rain-fed agriculture and the resultant low economic development, widespread poverty and weak capacity. Reduced agricultural production and worsening food insecurity, increased flooding and drought, increased occurrence of crop/animal/human epidemics and an increased risk of conflict over scarce and degraded land and water resources are already evident outcomes of climate change.

Farmers have been at the forefront of changes and “shocks” since time immemorial, so they are well placed to counter climate change. However, “coping” is insufficient if food security is to be achieved. Innovations are required to face the environmental changes.

For sure agriculture, particularly rainfed crop farming, is a weather sensitive activity and where the agricultural system has limited flexibility, the agricultural industry is greatly hampered by weather and climate variables. In relatively low external input agriculture, which is the case for most developing countries, farm management is closely connected to what climate, soil and topology will allow to do. Microclimate and topo-climate management and manipulation, within the farming system selected - be it often with limited options - is part of that farm management strategy. Indigenous as well as scientific knowledge on these matters are in high demand for successful and sustainable farm operations and minimize climate change related hazards.

The investments required to foster these improvements will need to include the transfer and implementation of supporting technologies, such as weather forecasting, early warning systems and risk insurance.

Mitigation

In the meantime on a global scale, agriculture, deforestation and other types of land use are responsible for some 25% of greenhouse gas (GHG) emissions. Contributing to reduce the global emissions from agriculture and deforestation requires specific approaches to development, where the cost of the investments and of the production systems is not only measured by their actual value from the market, but also include the various costs to the environment. More sequestration of carbon in the soils and in the biomass is also part of the global solution.

Being able to transform agriculture to feed a growing population in the face of a changing climate without hindering the natural resource base will not only achieve food security goals but also help mitigate the negative effects of climate change. More productive and resilient agriculture will need better management of natural resources, such as land, water, soil and genetic resources through practices, such as conservation agriculture, integrated pest management, agroforestry and sustainable diets.

Some 70 % of this mitigation potential could be realized in developing countries. Many of these strategies also improve food security, foster rural development and help communities adapt to climate change. However, tradeoffs may have to be made when seeking to reach different development goals, such as climate change mitigation and adaptation, sustainable agricultural production and poverty reduction. Balancing these trade-offs requires that interventions be planned and implemented in a coordinated manner over different time frames and across different sectors and landscapes. Although climate-smart agriculture's central focus is on farming, pastoral, forestry and fishing systems, a broader perspective is needed to achieve its overall goals.

Public policies, from a local to a international level

The increased risks associated with any decision made, whether by producers or public- or private-sector decision-makers, call for the introduction of new economic, social and environmental resilience mechanisms. For politicians, it is not only a question of ensuring food security and boosting agricultural output. There are many aims, centring on livelihoods, the repercussions for poor populations, and the preservation of biodiversity, forests and environmental services. Each has significant effects on human wellbeing, and all need to be taken into consideration by means of an integrated approach.

In particular, agriculture is impacted by population growth, changing consumer demand, and market functioning. The science-policy interaction should be of use in developing appropriate tools to ensure that the right decisions are made. The approach taken could vary from one place to another and from a local to a global level. It will need to take account of possible conflicts between targets, and if necessary choose between them.

Building capacities on agriculture and climate change

Building capacity in climate change science is critical under the conditions of increasing trend of climate hazards, variability and change. It has much to contribute to sustainable solutions for the serious problems encountered in agricultural production and environmental protection. Education, science and technology development need to concentrate on the problems of changing local farming and agro-business in a highly variable and vulnerable environment. Capacity building in climate science training and research must grow jointly with a general increase of the combination of social, biological and physical sciences to agriculture and to the environment. This will aid efforts to address the emerging challenges of climate change and variability and other natural risks.

Indeed, the skills and competences of professionals able to address adaptation to climate change are those needed to address innovation in agricultural systems. However, beside these general competences, they also need to assess the framework of constraints that shape the future conditions of agriculture on the long term, in which those innovations have to take place. This includes (i) the capacity to understand –eventually contribute to- the elaboration of climatic models and their interaction with agricultural constraints, (ii) the opportunities that technological or organisational outbreaks may offer in various domains, from genetic progress to agroecological options, and from water management to value chains valorisation or microinsurance systems extension, and (iii) the ability to analyse, support and evaluate the process of change, at the various scales from the local village to the international policies.

This is, in short, what Master ACT addresses. The success of this ambition is key for our future.