CLIMATE CHANGE AND FOOD PRODUCTION

AGRICULTURE AND CLIMATE CHANGE – THE CHALLENGES

Projected changes in the frequency and severity of extreme climate events can have consequences on food production, potentially provoking crop failure, forest-disturbance, diseases and mortality of livestock, losses of genetic resources available for food and agricultural production, and regional changes in the distribution and productivity of particular fish species. It is predicted that a 1-3° C increase in temperature will destabilize food production particularly in low-latitude regions, while increased recurrent droughts and floods will affect local production especially in dry and tropical ecosystems. This will affect food security, and smallholder and subsistence farmers, pastoralists and fisherfolk will suffer the brunt of the complex and localised impacts of climate change[1]. In the majority of world regions improved agricultural management technologies will be needed to deal with complex issues such as a potential increase demand for irrigation water.

Table 1: Global C stocks in vegetation and top 1 m of soils

Biome	Area	Carbon Stocks (Gt C)		
	(10^6 km^2)	Vegetation	Soils	Total
Tropical forests	17,6	212	216	428
Temperate forests	10,4	59	100	159
Boreal forests	13,7	88	471	559
Tropical savannas	22,5	66	264	330
Temperate grasslands	12,5	9	295	304
Deserts and semi-deserts	45,5	8	191	199
Tundra	9,5	6	121	127
Wetlands	3,5	15	225	240
Croplands	16,0	3	128	131

Source: Watson, R. T., Noble I. R., Bolin, B., Ravindranath,N.H., Verardo, D. and Dokken, D. (2000). Land Use, Land Use Change and Forestry. 375pp. Cambridge University Press, Cambridge, UK.

But adaptation options imply different costs and technologies and climate change raises new demands on policy support for sustainable agricultural practices and technologies[2]. Sustainable agricultural production can play a role in adapting to and mitigating the impacts of climate change, because agriculture is:

- an important emitter of greenhouse gases;
- the sector with the highest potential for the reduction of emissions (Table 1);
- the sector most affected by climate change, with the largest need for adaptation.

1. Apapted from: Easterling, W.E., P.K. Aggarwal, P. Batima, K.M. Brander, L. Erda, S.M. Howden, A. Kirilenko, J. Morton, J.-F. Soussana, J. Schmidhuber and F.N. Tubiello, 2007: Food, fibre and forest products. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 273-313.

2. ibid


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ADAPTATION, ECOSYSTEM SERVICES AND CLIMATE CHANGE

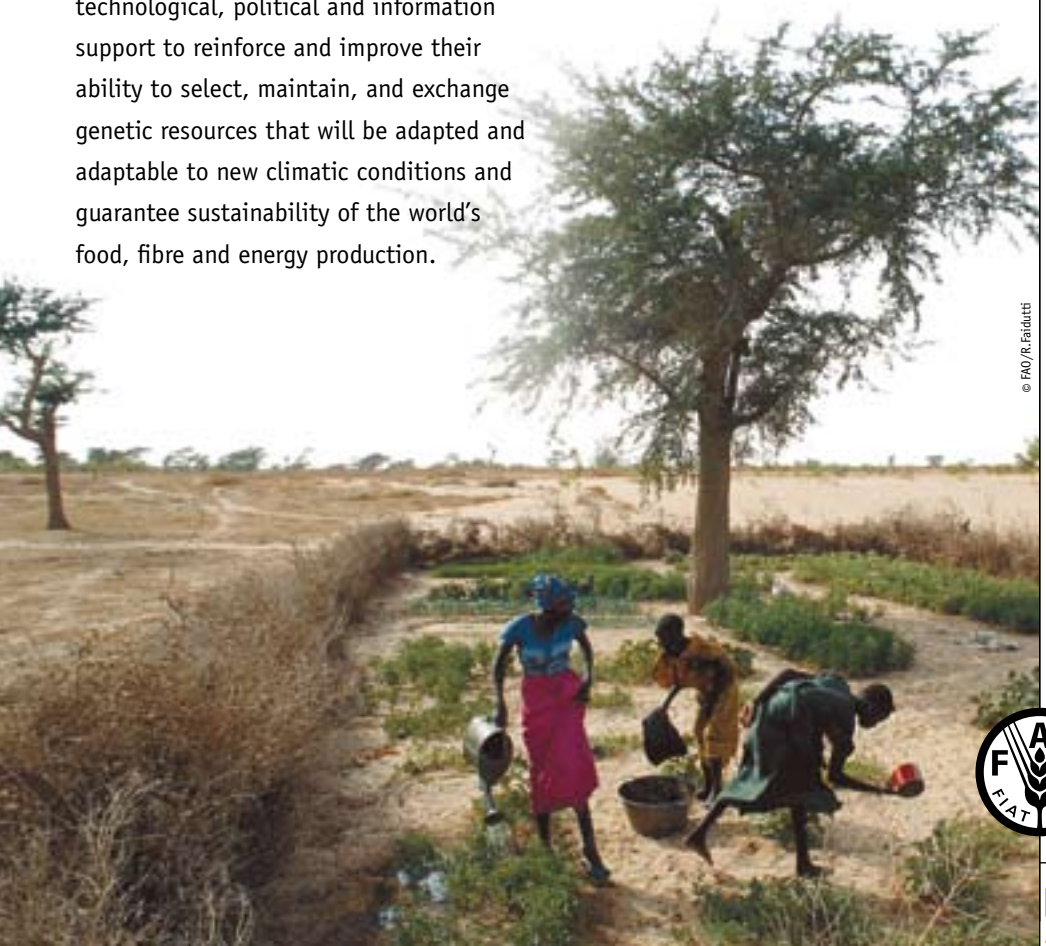
Ecosystem services build important measures of resilience and risk mitigation into agriculture – elements that are increasingly important under changing climates. The greater number and kinds of facilitative interactions in an ecosystem mean that as conditions change, different groups of organisms (e.g. pollinators) are favoured to continue providing ecosystem services.

THE ESSENTIAL ROLE OF AGRICULTURAL BIODIVERSITY

Biodiversity for food and agriculture will be affected by climate change, but will also be an important element in the development of production strategies to meet the challenges of climate change. It is also very likely that climate change will affect the ecosystem services provided by agricultural biodiversity. Global warming will create new climates, changing where, how, and what crops farmers will be able to cultivate. To face these challenges farmers will have to rely on adapted genetic resources, and need technological, political and information support to reinforce and improve their ability to select, maintain, and exchange genetic resources that will be adapted and adaptable to new climatic conditions and guarantee sustainability of the world's food, fibre and energy production.

THE ESSENTIAL ROLE OF INDIGENOUS KNOWLEDGE

The traditional knowledge held by indigenous and other peoples in agriculture can be considered as a "storage" of knowledge, including on best practices for sustainable agriculture. This knowledge has always been essential in adapting to environmental conditions. Knowledge of the details of local crop production patterns is the necessary foundation of site specific adaptation of cropping systems to increased climate variability.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INDIGENOUS POTATOES AND WILD RELATIVES

With drastic climate change, areas where indigenous potatoes and wild relatives grow naturally could be reduced and many of these could become extinct. By conserving and utilizing the potato genetic diversity raised by their ancestors, Andean women farmers help to ensure world food security and adaptation to climate change.


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AGRICULTURE FOR BIODIVERSITY FOR AGRICULTURE