Food Security and Climate Change

“It is essential to address the fundamental question of how to increase the resilience of present food production systems to challenges posed by climate change. …We urge governments to assign appropriate priority to the agriculture, forestry and fisheries sectors, in order to create opportunities to enable the world’s smallholder farmers and fishers, including indigenous people, in particular in vulnerable areas, to participate in, and benefit from financial mechanisms and investment flows to support climate change adaptation, mitigation and technology development, transfer and dissemination. We support the establishment of agriculture systems and the sustainable forest management practices that positively contribute to the mitigation of climate change and ecological balance.” Final Declaration of the High-Level Conference on World Food Security: the Challenges of Climate Change and Bioenergy, FAO 2008

FOOD SECURITY & FOOD SYSTEMS

Food Security exists when all people at all times have physical or economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. To achieve food security, all four of its components must be adequate. These are: availability, stability, accessibility and utilization.

A food system is a set of dynamic interactions between and within bio-geophysical and human environments that influence both activities and outcomes all along the food chain (production, storage and processing, distribution, exchange, preparation and consumption).

Food security is the outcome of food system performance at global, national and local levels. It is often directly or indirectly dependent on agricultural and forest ecosystem services, e.g., soil and water conservation, watershed management, combating land degradation, protection of coastal areas and mangroves, and biodiversity conservation.

CLIMATE & CLIMATE SYSTEM

Climate refers to the characteristic conditions of the earth’s lower surface atmosphere at a specific location, whereas weather refers to the daily fluctuations in these conditions at the same location. Although climate per se relates only to the varying states of the earth’s atmosphere, the other parts of the earth system also have a significant role in forming climatic conditions. Earth system dynamics that produce weather are referred to as the climate system.
GLOBAL WARMING & CLIMATE CHANGE
Climate change is a natural process that takes place simultaneously on various timescales – astronomical, geological, and decadal. It refers to the variation over time in the earth’s global climate or in regional climates, and it can be caused by both natural forces and human activities. According to the Intergovernmental Panel on Climate Change (IPCC) most of the observed increase in globally-averaged temperatures since the mid-20th century, the phenomenon known as global warming, is very likely caused by human activity, principally the burning of fossil fuels and deforestation, which have increased the amount of greenhouse gases in the atmosphere. The warming is in turn producing dramatic changes in climatic conditions such as those shown in the box below.

- EFFECTS OF CLIMATE CHANGE IMPORTANT FOR FOOD SECURITY
  - Increase in availability of atmospheric carbon dioxide for plant growth
  - Increase in global mean temperatures
  - Increase in frequency, duration and intensity of heat waves
  - Increase in precipitation
  - Increase in annual occurrence of hot days
  - Increase in frequency, duration and intensity of dry spells and droughts
  - Changes in timing, location and amounts of rain and snowfall
  - Increase in frequency and intensity of extreme weather events
  - Increase in annual occurrence of high winds, heavy rains, storm surges and flash floods, often associated with tropical storms and tornadoes
  - Greater weather variability
  - Greater instability in seasonal weather patterns
  - Change in start and end of growing seasons
  - Rise in sea level
  - Inundation of human habitats
  - Saltwater intrusions

IMPACTS OF CLIMATE CHANGE ON FOOD SECURITY
Significant changes in climatic conditions will affect food security through their impacts on all components of global, national and local food systems. More frequent and more intense extreme weather events and droughts, rising sea levels, and increasing irregularities in rainy season patterns are already having immediate impacts on food production, food distribution infrastructure, incidence of food emergencies, livelihood assets and opportunities and human health, in both rural and urban areas. Impacts of gradual changes in mean temperatures and rainfall are likely to be disruptive, whether positive and negative, and may include:

- Changes in the suitability of land for different types of crops and pastures,
- Changes in the health and productivity of forests,
- Changes in the distribution, productivity and community composition of marine resources,
- Changes in the incidence and vectors of different types of pests and diseases,
- Loss of biodiversity and ecosystem functioning of natural habitats,
- Loss of arable land due to increased aridity and associated salinity, groundwater depletion and the rise in sea level.

CLIMATE CHANGE, AGRICULTURAL PRODUCTION AND FOOD SYSTEMS
Agriculture, forestry and fisheries are all sensitive to climate. Changes in agricultural production patterns will affect food security in two ways:

1. Impacts on the production of food will affect food supply at both global and local levels. Globally, higher yields in temperate regions could offset lower yields in tropical regions. However, in many low-income countries that
have limited financial capacity to trade, and that rely heavily on their own production to cover their food requirements, it may not be possible to offset declines in local supply without increased reliance on food aid.

2. Impacts on all forms of agricultural production will affect livelihoods and ability to access food. Producer groups less able to deal with climate change, such as the rural poor in developing countries, risk having their safety and welfare compromised.

Besides food and agriculture production, other food system processes are equally important for food security. Overall, food system performance is much less dependent on climate today than it was two hundred years ago. Now, however, there is an increased risk of storm damage to transport and distribution infrastructure, with consequent disruption of food supply chains. Climate change is likely to make access to food more difficult for many currently vulnerable people and other low-income consumers, whether because of reduced own production, loss of employment opportunities as farm and non-farm production patterns shift, or lower purchasing power due to rising market prices for food. Additionally, the rising cost of energy and the need to reduce consumption of fossil fuels have given rise to a new calculus — that of “food miles” — which should be kept as low as possible in order to reduce emissions. The combination of all of these factors could result in a reversion to more local responsibility for food security in the future.

**MARKET UNCERTAINTIES**

Recent trends show food prices increasing faster than incomes. Growing scarcities of water, land and fuel are likely to put increasing pressure on food prices even without climate change. Additional pressures on these resources due to climate change, the introduction of mitigation practices that have the potential to create land use competition, and the attribution of market value to environmental services to mitigate climate change, also have the potential to cause significant changes in relative prices for different food items, and an overall increase in the cost of an average food basket for the consumer.

**WHAT IS CLIMATE CHANGE RISK?**

Risk exists when there is uncertainty about future outcomes from presently ongoing processes or the occurrence of future events. The more certain we are of an outcome the less risk there is, because certainty allows us to make informed choices and prepare for dealing with climate change impacts.

Climate change is creating increased uncertainty about future temperature and precipitation regimes which makes investments in agriculture and other weather-dependent livelihoods inherently more risky. The risk absorption capacity of poor people is such that they are unlikely to be able to cope with the added risk imposed by climate change. At the same time, there is increasing certainty that extreme weather events are going to increase in frequency and intensity and vulnerable locations are known. Because of this, there is growing certainty that asset losses attributable to weather-related disasters will increase. Whether these losses involve productive assets, personal possessions or loss of life, the livelihoods and food security status of millions of people in disaster-prone areas will be adversely affected.
The greenhouse gas emissions from the food and agriculture sector contribute over 30% of current annual total emissions. The livestock sector on its own accounts for 18%, including over two-thirds of total emissions attributable to deforestation and over one-third of total agricultural releases of methane and nitrous oxide. However, the sector also has significant potential for mitigating climate change.

**WHAT DOES OUR FAITH TEACH US?**
In his message for the 2010 World Day of Peace, Pope Benedict said, “There is a need to make political and economic decisions which ensure forms of agriculture and industrial production capable of respecting creation and satisfying the primary needs of all.” The pope continued, “How can we forget that the struggle for access to natural resources is one of the causes of a number of conflicts, not least in Africa, as well as a continuing threat elsewhere? For this reason too, I forcefully repeat that to cultivate peace, one must protect creation.”

**“FOOD SECURITY AND CLIMATE CHANGE ARE INTRINSICALLY LINKED.”**
U.S. Secretary of Agriculture, Thomas Vilsack

**REMARKS BY U.S. SECRETARY OF AGRICULTURE IN COPENHAGEN**
Both food security and climate change challenges need to be addressed simultaneously and urgently, with responsible action considering both, in a holistic and coherent manner. Only in this way, can we (i) achieve food security, for which adaptation of agricultural systems is crucial and (ii) avoid catastrophic climate change, which requires that agriculture and forestry contribute to overall mitigation efforts to reduce and remove greenhouse gases. Food Security and Climate Change are intrinsically linked and closely intersect in the agriculture sector. Agriculture offers opportunities for early action on climate change; these opportunities should not be missed and barriers to implementation, including among smallholder farmers, should be overcome. Cost-effective responses will require action across sectors and at different scales, including that of landscapes.