CLIMATE CHANGES, WATER AND AGRICULTURE

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BIGGEST AGRICULTURE CHALLENGE:
Fedd All The World´s Population

Source: http://www.impatientoptimists.org/
Main linkages between climate change, the water cycle and farm systems

Climate Change
Global warming, regional variability

Long Term Changes
in temperature and precipitation, solar radiation, etc. (trends and shifts)

Extreme events
Temperature extreme, precipitation extremes and other (hurricanes, cyclones, etc.)

Water quantity
- Water availability (runoff, soil moisture, groundwater, snow and glaciers)
- Crop water requirements

Water quality
- Water quality changes
- Declining water quality and availability

Crop production systems
- Impact on crop areas
- Impact on crop yields

Agricultural systems

Livestock production systems

RAINFED VS. IRRIGATED AGRICULTURE

• RAINFED LAND:
  • Account for more than 80 percent of global crop area
  • Account for more than 60 percent of global food output
  • ESPECIALLY SUSCEPTIBLE TO THE IMPACTS OF CLIMATE CHANGE

• IRRIGATED LAND:
  • Provides 40 percent of the world’s food from just 20 percent of the cultivated area
IRRIGATED AGRICULTURE ADAPTATION TO CLIMATE CHANGE AT FARM LEVEL

1. Manipulation of crop selection and cropping calendar;
2. Better management of factor inputs – nitrogen and agricultural chemicals;
3. Improved water management technologies and techniques for cropping.
DIFFERENT LEVELS OF ACTION FOR THE ADAPTATION OF AGRICULTURAL WATER MANAGEMENT TO CLIMATE CHANGE

• On-farm adaptation of water management.
• Water management policies for adaptation at the watershed level.
• Risk management approaches for adapting to increasing risks of droughts and floods.
• Agricultural policy coherence and the role of market drivers.
• Interactions between mitigation and adaptation of agricultural water management.
ON FARM ADAPTATION

• Adoption of drought-resistant varieties.
• Change in sowing dates to benefit from a longer growing season and reduce the probability of the crop being exposed to a drought period.
• Increased irrigation efficiency to reduce the sensitivity of the farm to swing in water supply conditions.
• Adoption of irrigation in previously non-irrigated agricultural areas to overcame a water deficit.
• Changes in crop rotations to include crops that are less exposed and/or less sensitive to water deficits or droughts, etc.
WATER MANAGEMENT POLICIES

• Regulatory rules.
• Economics instruments such as water pricing and quota trading (increase the efficiency of water allocation).
• Collective water rules.
RISK MANAGEMENT APPROACHES

• Insurance and compensation policies against droughts and floods.
• Innovative risk-sharing tools.
• The need for a holistic approach for managing weather risks under climate change.
AGRICULTURAL POLICY

• Market drivers, price signals and international risk-sharing.
• Policy sequencing: fostering an enabling policy environment for adaptation.
INTERACTIONS BETWEEN MITIGATION AND ADAPTATION

• Synergies and trade-offs are site-specific:
  • Direct land use change (crops to pasture, crops to forest, marginal and pasture lands to crops and bioenergy)
  • Agricultural management practices (tillage practice, crop mix and perennials, irrigation management, fertilizer management, chemical use reduction, manure management, breeding and animal species choice)
  • Bioenergy (liquid fuels, electricity, pyrolysis — biochar, feedstocks, animal wastes, processing by-products)
Elements of water and natural resources management that should be put in place in order to 1) assess climate change impact on agriculture and 2) develop adaptive strategies.

Source: FAO Water Report 36
Climate change impacts will further increase risk in rainfed farming systems and may exaggerate current risk-hedging behavior by small farmers. By contrast it has been assumed that because productivity is higher in irrigation, the potential marginal gains of further improving land and water productivity are more limited. However, yields and water productivity are well below potential in many regions; significant productivity increases can be expected in both yield and water use efficiency by better management of all farm inputs and with optimal use of nitrogen fertilizer. Irrigated agriculture, even with declining water availability, generally offers a more secure risk environment for more intensive management.
WATER IS CENTRAL TO FUTURE ADAPTATION TO CLIMATE CHANGE
THANK YOU!