Implications of Climate Change for Agriculture and Food Security in South Asia

International Symposium on Climate Change and Food Security in South Asia, Dhaka 25-30 August 2008
Plan of presentation

- Current agriculture production and food security status in South Asia;
- Climate Change and its implications for agriculture and food security in South Asia;
- Initiatives on climate change mitigation and adaptation in agriculture sector;
- Experiences and lessons learnt; and
- Knowledge gaps and opportunities.
Agriculture in South Asia

- Diverse farming systems: intensive rice-wheat to sparse arid and mountains.
- Contains a population of 1.51 billion (2007); projections anticipate 1.73 billion by 2015.
- Agriculture sector.
  - Approximately 750 million people,
  - 60% of the labour force,
  - Accounts for about 23% GDP.

Source: FAO- Farming Systems and Poverty (2001)

Note: South Asia defined in this paper comprises eight countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.
Food Production and Consumption in South Asia

- Area under arable land and permanent crops. Estimated at 213 million ha.
- Total food production has increased 3 folds.
  1961 - 117 million tonnes
  2006 - 348 million tonnes
- The average food intake.
  Expected to increase from 2364 to 3040 kcal/person/day by 2030

Source: FAOSTAT (2008)
Poverty and Food Security Status in South Asia

- 312 million people (21%) in South Asia are still undernourished;
- Indicators of extensive poverty
  - population below poverty line - 26.4%
  - child malnutrition - 51%
- South Asia lags on most human development goals (World Bank, 2008)

**Per capita food consumption in South Asia**


Projections of Climate Change Impacts for South Asia

- **Glacial melt** in Himalayas is projected to increase flooding and affect water resources;
- **Fresh water availability** is projected to decrease especially in dry season;
- **Temporal and spatial changes** in precipitation will have major implications for agriculture;
- Densely populated low lying areas of **mega delta** are at risk;
- The **risk of hunger** is projected to remain very high.

Climate Change and its Implications for Agriculture and Food Security in South Asia

- The crop yields could decrease up to 30% in the region by the mid-21 century (Lobell et al., 2008).
- Irrigation demand for agriculture in arid/semi-arid regions.
  - expected to increase by 10% for temperature increase by 1°C
- Increased dryness during pre-summer season may accelerate the forest fire incidences.

Source: FAO- Farming Systems and Poverty (2001)
Agricultural Eco-systems Vulnerable to Impacts of Climate Change in South Asia

**Mountain ecosystems**
- Himalayan ecosystems vulnerable to Glacial Lake Outburst Floods (GLOS) and flash floods

**Low-lying coastal regions**
- Sea Level Rise (SLR), saline water intrusion, and storm surge: threat to mangroves and coral reefs

**Semi-arid tropics**
- Reduced rainfall, drought and less ground water recharge

**Small islands**
- High exposure of agricultural infrastructure to SLR

**Mega-deltas**
- Intense hydrological cycle and flooding during monsoon season (Ganges - Brahmaputra)
FAO’s Climate Change and Food Security Framework

**FAO**

- promotes dialogue about the impacts of climate change and possible solutions;
- assists to identify potential adaptation and mitigation options;
- assists to integrate climate change responses in food and agricultural policies and programmes;
- supports to mainstream adaptation in
  - National Programme for Food Security (NPFS)
  - National Forest Programmes (NFPs).

Strategies for Adapting to Climate Change in Food and Agriculture

- Protecting local food supplies and livelihood assets against the impacts of weather and extreme events;
- Avoiding disruptions or decline in food supplies due to changes in temperature and precipitation; and
- Protecting eco-systems through provision of environmental services.

Source: FAO (2008)
Strategies for Mitigation in Food and Agriculture sector

Reducing Emissions
- Reducing agricultural and forestry emissions of carbon dioxide
- Reducing agricultural emissions of methane and nitrous oxide

Sequestering Carbon
- sustainable forest management, reforestation and afforestation
- rehabilitation and restoration of degraded grasslands and cultivated organic soils
- promoting conservation agriculture

Highly degraded croplands with soil carbon sequestration potential and high poverty rates
(Source: FAO-NRCE, 2008; SOFA 2007)
Regional and National Initiatives on Climate Change Adaptation and Mitigation

- SAARC prioritized regional issues related to food security:
  - Stagnating production and productivity
  - Over exploitation and degradation of natural resources
- The SAARC Summit (New Delhi, April 2007) called for a climate resilient development in South Asia.
- SAARC Expert Group Meeting on Climate Change (July, 2008) - a draft SAARC Action Plan on Climate Change
- Government of Bangladesh has prepared a draft Climate Change Strategy and Action Plan (2008).
- India released its National Action Plan on Climate Change in June 2008 with a focus on harnessing renewable energy.
FAO’s initiatives on Climate Change and Food Security in South Asia

- FAO’s regional programmes: Pro-poor policy formulation.
  - Enhanced institutional capacity on pro-poor agricultural and rural development policies
  - Regional Programme on Food Security
- Bangladesh: Livelihood Adaptation to Climate Change
- India: Gender sensitive climate change adaptation
- Nepal: Strengthening disaster preparedness and climate change adaptation
- Pakistan: Crop area and yield forecasting
Key lessons and messages

- Adaptation must be addressed in the broader context of vulnerability
  - Location specific and cross sectoral
  - Addressing current risks are suitable entry point
  - Synergies between climate change adaptation and mitigation
  - Participatory and community based extension and research
Key lessons and messages

- **Improved operational linkages and synergies**
  - Climate Change Adaptation, Disaster Risk Management and R & D.

- **Constraints for implementation of adaptation**
  - inadequate data, coordination and financial resources.

- **Cooperation between countries in the region**
  - monitoring, data exchange and policy development.

- **Regional facilities for adaptation research, information and training**
  - Interactive Climate Change Adaptation Information Centre (iCCAIC).
Knowledge Gaps and future opportunities for Adaptation and Mitigation in South Asia

- **Knowledge Gaps**
  - Comprehensive impact assessment
    - \( \text{CO}_2 \) fertilization, food production and food security nexus
    - aquatic biota, pest and diseases, coastal and mountain ecosystems
  - Location specific adaptation strategies
  - Policy instruments to guide adaptation

- **Future Opportunities**
  - Mitigation through C-sequestration in soil
  - SAARC’s Regional Action Plan
    - synergies in collection, exchange, and dissemination of data
  - Diversity of institutions and experience provides opportunity to upscale climate change initiatives
THANK YOU FOR YOUR ATTENTION