Food Resource

Climate change and Food Security

Revisiting Sustainability
Some Basic Information

- Source of food – agriculture, animal husbandry and fishing

- Minimum dietary requirement
  1825 cal/person per day on an average (*FAO 2003-05)

- World agricultural population per hectare 1.7 person – food production as livelihood
  (*FAO 2003-05)
Significant Factors

- Increasing population implies less per capita food availability
  
  *World population growth rate = 1.2% (2005)* US census bureau, international database

- Relation between population growth and growth in food production becomes important
  
  *Food production in 64 out of 105 developing countries lagging behind their population growth rates (FAO, 2003-05)*
# World Food Problem

<table>
<thead>
<tr>
<th>Country/country group</th>
<th>No. of people malnourished</th>
<th>% pop malnourished</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>848 million</td>
<td>13</td>
</tr>
<tr>
<td>Developed country</td>
<td>15.8 million</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Developing country</td>
<td>832 million</td>
<td>16</td>
</tr>
<tr>
<td>India</td>
<td>230 million</td>
<td>21</td>
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</tbody>
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Source: FAO (2003-05)
Indian Scenario

- 700 million dependent on agriculture
- From 1993-95 to 2003-05 average annual rate of change of population = 1.7%
  food production = 1.6%
  food per person = -0.1%

- From 1951 to 1997: gross irrigated area (GIA) (includes double cropping) expanded four-fold, from 23 M Ha to 90 M Ha

- With creation of irrigation potential of 89.56 M Ha by 1996-97, India has the largest irrigated area among all the countries in the world
Problem of Food Security

- Increasing cost of cultivation
- Ecological degradation
- Demand for water
- Rising population
- Low productivity
- Climate change
Unsustainable Agriculture

- Modern agricultural pattern pollutes environment with excessive use of pesticide and fertilizer

- Monoculture (single crop) enhances the risk of production

- Need for Increasing demands for food

- Reducing/ stagnating crop yields: fatigue of intensive agriculture and climate change
Unsustainable Agriculture (Contd.)

- Incremental use of inorganic fertilizer and pesticide
- The inefficient water pumping in the agriculture sector also has its impact on global warming and climate change through the emission of the GHG.

- Global impacts of climate change and global warming on agriculture are – *Net loss on world’s food supply*
Overexploitation of Resource

- Reducing availability of natural resources for agriculture
- Need for increased resources: land, water, fertilizers, capital
- Soils are being exploited faster than they can recuperate
- Excessive conversion of forests, grasslands and wetlands to agricultural land
- Fish resource, both marine and inland, show evidence of exhaustion
Cropland Management

There is thus an urgent need for integrated cropland management and preservation of environment

It includes…

- Water management (irrigation, drainage)
- Rice Management
- Agronomy
- Nutrient management
- Tillage/residue management
- Agro-forestry
- land-use change
- Perceptions from Field
- Climate parameters
- Seed variety
- Irrigation techniques
- Pest control
- Sustainable agriculture
- Adaptation priorities: technology, institution, human capacity building
Specific Information Needs

- Impact on food (crops, milk, fish) demand and supply - spatial and temporal differences
- Impact on nutrition - cereals, legumes, oil crops
- Impact on commercial crops (quality and quantity) - spices, tea, coffee, medicinal plants
- Impact on trade - internal and external
- Impact on natural resources - soil, water and air
- Impact on farmer’s livelihood
- Options to enhance adaptive capacity - farmer level, regional differences, government level
- Potential of agricultural land as carbon sink
- Policy implications: link with current development plans
Information Needs on Vulnerability

- Can we remain self-sufficient in food despite global climatic changes, urbanization and trade liberalization?

- Which regions and the social groups are more vulnerable to climatic changes?

- How will enhanced climatic risks affect livelihoods of resource-poor farmers-hill, coastal, tribals?

- How should different farmers adapt to cope with climate change? (in the background of changing scenario of demand and markets)
Mitigation of Climate Change/ Feedbacks on Environment: Information Needs

- Can alternate land use systems such as plantations and agro-forestry increase carbon sequestration and yet meet food demand?

- How much area can be taken out from agriculture for forestry; where and what policy measures would be needed?

- How much carbon is conserved by limited tillage options? For how long?

- What is the potential of biofuels for carbon mitigation; what policies and technologies would ensure their adoption by farming community?
Sustainable Initiatives

Israel’s drip irrigation system enhanced the efficiency of irrigation by 95% - food production almost doubled.

Calcutta releases waste water into surrounding lagoons – water is used for fish raring and growing vegetables.