

**Consultative Meet on Impact of Climate change on  
Agriculture & Farmers Adaptations  
On 13 October 2009  
Organized by WWF, West Bengal and Natural Resource  
Management Center(NRMC)**

**Key Note Address**

by

Shri. S.K. Mitra

Executive Director

National Bank for Agriculture and Rural Development, Mumbai

*“The threat from climate change is serious, it is urgent, and it is growing... If we fail to meet it - boldly, swiftly and together - we risk consigning future generations to an irreversible catastrophe.”*

*-- Barack Obama*

**Climate Change and Agriculture**

The issues of global warming and climate change have been debated for quite some time now and do not need to be emphasized. Climate change and agriculture are interrelated and climate change over the next century may have significant effects on crop production and food availability. The croplands, pastures and forests that occupy 60 percent of the Earth's surface are progressively being exposed to threats from increased climatic variability and, in the longer run, to climate change. It is speculated that by 2050, there would not be any glacier left in the world. The melting of ice would result in frequent floods and significant rise in sea level. Changes in rainfall pattern, shift in setting in / withdrawal of summers- winters and temperature shifts in the agro-eco systems will affect cropping patterns.

The UN Intergovernmental Panel on Climate Change (UNIPCC) report indicated that an overall increase of 2°C in temperature and 7% in rainfall would lead to an almost 8% loss in farm level net revenue. As climatic patterns change, so also do the spatial distribution of agroecological zones, habitats, distribution patterns of plant diseases

and pests and ocean circulation patterns with significant impact on agriculture and food production. Abnormal changes in the climate and resulting increase in frequency and intensity of drought and flood events have long-term implications for the viability of these ecosystems. The UNIPCC estimated that GDP in the developing countries would decline by 1.4–3.0% due to climatic change.

### **Climate Change Impact and India**

Changes in climate will affect India's entire environment, especially the nation's water resources, sea levels and biodiversity, impacting a wide range of sectors, particularly agriculture. The Nation's economy is closely tied with natural resource with over 65% of workers engaged in agriculture and allied sectors, and many others earning their living in coastal areas through tourism or fishing. There are many climate-related problems that people in India are already facing, such as diminishing water resources and frequent natural disasters, which are likely to be further aggravated by the impending changes in the climate. The poorest in the country, most of who live in rural areas, are almost totally reliant on natural resources for their food, shelter and living exposing their vulnerability to the impact of climate change. The impact of such changes in the country are estimated and quantified by various institutions and scientists of repute, a few of which, are quoted here under :

- ☞ A World Bank report on climate change impact based on case studies in India has focused on drought-prone regions of Andhra Pradesh, Maharashtra, and flood-prone districts in Orissa on the edge of climate tolerance limits. It highlights the possibility of the yields of major dry land crops declining in Andhra Pradesh. Sugarcane farmers of Maharashtra may see yields go down by as much as 30 per cent. Rice production in Orissa will face a similar fate with yields in the flood-prone coastal regions dropping by 12 percent.

- ☞ According to estimation by Sinha S K and Swaminathan M S (1991), a 2°C increase in mean air temperature could decrease rice yield by about 0.75 ton/hectare in the high yield areas and by about 0.06 ton/hectare in the low yield coastal regions. Further, a 0.5°C increase in winter temperature would reduce wheat crop duration by seven days and reduce yield by 0.45 ton/hectare. An increase in winter temperature of 0.5 °C would thereby translate into a 10% reduction in wheat production in the high yield states of Punjab, Haryana and Uttar Pradesh.
- ☞ As against the UNIPCC estimate that GDP in the developing countries would decline by 1.4 – 3.0% due to climatic change, in India, the effects of global warming are likely to be more severe. For every 2°C rise in temperature, the reduction in GDP is expected to be about 5% and for the next 6°C it would be anywhere near 15–16%.
- ☞ Likewise, FAO has estimated that India would lose up to 125 MT of cereals as the direct impact of climate change on agriculture - such as changes in agricultural inputs, shift in planting dates, preference of crop genotypes due to adaptation to changing climate, soil erosion, soil drainage and lower fertility level, increased incidence of pests, weeds and diseases in food crops. The shortage in grain production will result in less availability of food items, especially to the economically poor people.
- ☞ According to the National Climate Centre in Pune, rainfall has decreased in July and greater rainfall has been recorded in August in key crop growing areas of the country. Another major change in the monsoon pattern is that there has been a shift westwards, with the rainfall getting confined to certain pockets, which may result in floods, resulting in the lack of food for people.

The devastating impact of natural calamities that we experienced in the recent past – Cyclone Aila in West Bengal, unseasonal rains in Krishna – Tungabhadra catchment resulting in flash floods, and the

delayed on-set of monsoon in the country – are fresh in our mind, and perhaps, are the warning signals of what is imminent in the future on account of climate change.

With over 70% of Indian agriculture being rainfed and totally dependent on vagaries of monsoon and an equal percent of population depending agriculture for subsistence, the consequences of climate change could be to say the least, disastrous.

The impact of such climate changes is multi dimensional and can be summarized as under :

- ☞ Threat to agriculture and food security.
- ☞ Threat to biodiversity with adverse implications for forest-dependent communities.
- ☞ Adverse impact on natural ecosystems such as wetlands, mangroves and coral reefs, grasslands and mountain ecosystem.
- ☞ Adverse impact of sea-level rise on coastal agriculture and settlements.
- ☞ Impact on human health due to the increase in vector and water-borne diseases such as malaria.

### **NABARD's Initiatives in Sustainable development**

The key intervention that would be necessary to mitigate the impact of climate change with reference to agriculture sector is to develop and promote sustainable agriculture models with emphasis on resource conservation and management. Realising the importance of the issue, NABARD, through its **Corporate Mission** committed itself to '**promote equitable and sustainable agriculture**'. Several initiatives and interventions have been taken by NABARD in promoting sustainable agriculture with emphasis on natural resources conservation and management through people's participation. The two most important interventions of NRM by NABARD are i) Watershed Development Programme and ii) Adivasi development Programme (WADI). For

promoting these programmes, NABARD has setup two dedicated funds namely.,

- i. **Watershed Development Fund (WDF)** with a total corpus of Rs. 1125.21 crore (as on 31 March 2009), under which, 1700 watershed projects covering 1.7 million hectares were supported. These include 38 projects in West Bengal covering 0.28 lakh ha.
- ii. **Tribal Development Fund (TDF)** with a total corpus of Rs. 574.98 crore (as on 31 March 2009) under which 134 Adivasi development projects are supported for providing sustainable livelihood to 1.14 lakh tribal families in the country. In West Bengal, 5750 tribal families in five districts are being supported with sustainable livelihood under the programme.

The watershed development projects and adivasi development projects implemented by NABARD have clearly demonstrated adoptability and acceptability at field level. Presently in our watershed programmes, we do detailed Net Planning, probably we need to adopt the “Ecological Assessment Framework” too as done by FES- to know about the ecological/ ecosystem changes before and after our interventions

### **Natural Resources Management Centre (NRMC)**

A recent initiative by NABARD has been establishment of Natural Resources Management Centre (**NRMC**) at Kolkata. The key functional roles of the Centre include :

- ☞ Develop, test and refine appropriate natural resource management systems.
- ☞ Conduct action research on topical issues relating to natural resource management.
- ☞ Collaborate with other specialized national level institutes.
- ☞ Document the success stories for replication and up scaling
- ☞ Act as a data resource center on natural resources and disseminate the information relating there to.
- ☞ Provide leadership in natural resource management

☞ Contribute effectively to teaching and training in natural resource management.

Since inception in April 2009, the NRMC has initiated dialogues and consultative meets with other stakeholders in the field of NRM based livelihood option with special reference to *Aila* affected Sunderban region, and organized seminars on Opportunities in Green Finance and Community Based Natural Resources Management. In part fulfillment of the mandate for transfer of sustainable technologies, NRMC has also organized a training programme on innovative jute retting technology for the benefit of farmers from different jute growing states. The consultative meet on Impact of Climate change on Agriculture & Farmers Adaptations is another initiative of NRMC.

### **Climate Change - The Task ahead**

Addressing the impacts and combating climate change assumes top priority in our country in the context of its influence on the poorest of the society. It is a major challenge because the changes are not so visible and the strategies are seen as anti-developmental. The immediate priority is to undertake location specific research to study the climate change impact on major crops and cropping sequences. The need for such research is more critical in the Eastern Region of the country where the agrarian economy with small and marginal holdings predominates.

Apart from research, there is action for each of us within the individual self ambit and organizational ambit. Even the financial institutions and others can and should demonstrate and adopt strategies and techniques which will help in combating climate change. These could be use of energy efficient equipments and buildings, use of renewable energy and encouraging travel substitutions. Each of us can contribute.

I wish the “Consultative Meet on Impact of Climate change on Agriculture & Farmers Adaptations” being organized by WWF in

association with NABARD shall identify the research priorities and draw a road map for identifying necessary interventions to address the impact of climate change with focus on agriculture.

I would like to commend the efforts of WWF, NRMC and NABARD West Bengal Regional Office, in conceptualizing this meet and congratulate all of them for making it happen. I hope that, though a small step, this will be the beginning of a major initiative to mitigate the effects of climate change on Indian agriculture. At the end of the meet , I hope a few action points emerge and we need to follow up those.