

Food Security in the Context of Energy Crisis and Climate Change

D.K.Bagchi

All Over the universe, 'World Food Day' is observed on 16 November each year. This year this day seems to be much more significant. Our planet presently is in the midst of unprecedented economic crisis. Food security problem is also looming large throughout the globe, seriously affecting 800 million hungry people. All these phenomena indicate a colossal human development crisis all over the world. High energy intensive agriculture as we are witnessing now, is unable to overcome food security problem while accelerating environmental crisis as reflected through natural resource degradation, global warming and other negative features, leading to non-sustainability. But the scenario was not so even 100 years ago.

Transformation of Agricultural Scenario

If we trace back the history of agriculture hundred years ago, it could be noted that traditional farming with the available abiotic and biotic resources continued till the end of nineteenth century. Chemical farming in developed countries started only after industrial revolution whereas in our country so called 'Green Revolution' era in 60s of the last century. Synthetic agriculture characterized by high energy led growth obtained through combination of seed, water (mostly underground), inorganic fertilizer and chemical pesticides. Thus very high yield of food grain, especially rice and wheat, could be obtained till the end of 80s. India turned self sufficient in food although question of inclusiveness remain unanswered where millions of hungry people could not get access or afford the price of food and consumable commodities. However, limitations of chemical farming as observed through soil, biomass and bio-resource degradation/depletion and climate change along with reduction of nonrenewable fossil fuel suggested alternate pathway for agricultural development. Now it is clearly observed that "Business as usual is not an option". Moreover, it is all the more essential as even high energy led agriculture could not prevent stagnated/decelerated food production growth rate starting since early 90s till a couple of years ago. We are again alarmed to note that developed countries, in order to meet energy needs, are gradually replacing their cropland into cultivation of biofuel crops. John Vidal in New York Times observed the arrival of bio-fuel era while era of cheap food availability is over. Data revealing India's position ranking 66th among 88 hungry nations also indicate the worsening situation of our nation with regard to food security.

Food Crisis and our future Plan

Food prices during 2007 showed an increase of 40%, whereas 3years added together put the figures to 70%. This year till October there were food riots in 30 countries due to acute shortage leading to non accessibility to the poorer sections, being unable to afford. Since early 90s coinciding with the entry into market economy, India's decelerated growth rate in food production showing less than population growth has exhausted our massive buffer stock. We had to import rice and wheat during 2005-06 and year after. Only during the last couple of years situation has marginally improved. Now to achieve food security India's 11th 5-year plan aims at increasing cereals by 1.61 times whereas oilseeds and pulses by 3.63 and 2.14 times respectively as

compared to previous plan period. Again in view of the alarming energy crisis and environmental degradation Production strategies must include low cost sustainable technologies being acceptable to the small farmers.

International Assessment of Agricultural Science and Technology for Development With this backdrop of serious food security status and energy crisis along with unprecedented climate change, only silver line noticeable is the report entitled “International Assessment of Agricultural Science and Technology for Development” (IAASTD) submitted to the United Nation on 15 April, 2008. Move was initiated at Johannesburg meeting in 2002 with the involvement of UN, World Bank, all participating National Governments, academics, business corporate as also nongovernmental voluntary organizations 400 inter nationally reputed scientists with the help of all relevant organizations, after thorough studies for five years submitted the report to the united nation. Summary of the report can be accessed through the website www.agassessment.org .Content of the report has the approval of all participating governments including India although United States of America, Australia and Canada have not given their approval. Uniqueness of this monumental effort is that after reviewing consequences of modern energy-input agriculture, it has recommended the roadmap for future agriculture with emphasis on small farm productivity through eco-friendly technologies. Main focus is on achieving food security with environmental and livelihood sustainability in the process, broad discussions on all influencing aspects viz. Bioenergy, Biotechnology, Climate change, Human health and Nutrition.

Natural resource management, Trade and markets, Indigenous technical knowledge and Women in Agriculture were thoroughly discussed before suggesting action points. In view of two burning topics i.e. Bioenergy and Climate change regarded as main themes of this year’s International Food Day, attempts would be made to discuss the topics as outlined by this international assessment.

Bioenergy:

Unrestricted energy use especially by developed countries has resulted into severe energy crisis reflected through increased greenhouse gas emissions causing global warming, climate change and other negative effects. Besides, being non-renewable we are fast moving towards total depletion of fossil fuels through over use This has led to recent worldwide action to go for alternate energy sources like solar or wind energy. However, since the dawn of civilization we are used to use fuel woods and dried biomass as energy source.. Presently these are the only sources for meeting daily needs of poor and marginal people living in rural areas. However, with alarmingly quick depletion of forest resources leading to desertification, fuel woods are also becoming scarce day by day. It is estimated that 90 % of rural energy sources are mostly obtained from forest biomass, especially in Sub-Saharan and South Asian countries

Present mode of utilizing green biomass and cow-dung through open air combustion for cooking and lighting may pose environmental hazard through GHG emission. For sustainable development we must look for other options like utilization of most of these sources as manures and compost and thus decreasing chemical fertilizer use in farming. This again necessitate research and commercialization of improved chulla and cooking stove ,biogas use and other user/environment friendly low cost measures

with constant encouragement for reforestation and afforestation. In this context policy initiative to generate first generation bio-fuels consisting of bio-ethanol and bio-diesel were noted, specially in developed countries where contribution from these were 1% of total in 2005.

Crops having potential to produce bio-ethanol and bio-diesel are maize, sweet sorghum, sugarcane, soybean, cassava, rapeseed and oil palm etc. Fast growth rate of these energy sources was due to support from the governments through subsidy and other incentives. USA and European countries are vigorously pursuing the policies of increased bio-fuel production. USA has planned to divert 20% of maize acreage in producing crops for oil. Developed European countries are not far behind. In the process, drastic curtailments of food crop area seem to be the main cause of scarcity leading to food insecurity. Unfortunately while encouraging such programs USA is blaming India and China for over use of food resulting global scarcity. To achieve reasonably high production of bio-diesel our national efforts to popularize jatropha may be mentioned in this regard. Program planning and execution seem to be rather unorganized in jatropha cultivation where we are yet to succeed in selection of sites, varieties and technologies. to make it a viable alternate source.

Against the move to divert food crop area into bio-fuel production international protest and resistance must be organized those who are concerned about food security problem must come forward to join this movement, which in all probability, will be led by African, South Asian and Latin American nations. Another bio fuel source is next generation bioenergy from green biomass and agricultural residues enormously available in our tropical climate. Research and development to get energy from these are still in the nascent stage and policy decisions to encourage this is very much necessary.

Climate Change

This change can very well be attributed to anthropogenic reasons although alarming signals in this regard were forcefully given since the day of publication of "Silent Spring". Subsequently all the international environmental summits since 1970s have been in unison, giving warning of global warming and changing behavior of nature. Only after the publication of IPCC (International Panel on Climate Change) report last year worldwide awareness seems to have been noted. Present devastatingly worsening situation can be assessed if we note some of the observations and findings by IPCC given below.

Findings:

- Half of world's wetlands are lost
- One fifth of fresh water species extinct
- 2.2 million people killed every year by contaminated water
- Since 1990, 90,000sq.km.of forest each year is destroyed by forest fire
- Two third of the farmlands are degraded.

IPCC report has also given some revealing figures:

- During last 100 years average increase in global temperature is 0.74.C
- Since 1995 11of 12 years are recorded to be the warmest in 100 years

- From 1970 onwards we have experienced more intense and long drought than ever before.
- There are significantly high increases of extreme climate events as noted through more frequencies of earthquakes, floods, tornados, cyclonic storms etc.
- Biodiversity of all animal, birds and plant species are adversely affected with near extinction of many.

If we look into the effects of green house gases (GHG) towards global warming we find that 70.23 and 7% of warming are due to carbon di-oxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) respectively. Present agricultural practices like paddy cultivation in low land and livestock rearing significantly increase methane concentration while inorganic fertilizers increase emission of nitrous oxides. Again current land-use pattern and deforestation are largely causing increase of carbon di-oxide in the atmosphere.

Suggestions regarding Future Activities

Thus from the discussion above it may be concluded that on one hand present agricultural practices accelerate climate change, while changing climate is also worsening agricultural productivity. Thus mitigation programs should include action plans in various farm/allied sectors. Firstly we must pay attention to sustainable land use approach through increasing diversity as also crop land expansion (horizontally or vertically) by natural ecosystem suited species. Intensive programs on afforestation, reforestation and emphasis on agro-forestry are some mitigation options. We must try to shift our present energy intensive agriculture system characterized by more fossil fuel use causing natural resource degradation and consequent depletion. Changes must be directed towards low-input, eco-friendly sustainable production systems. This in turn necessitates a switch over to organic farming where action plans should include research and development agenda like a).restoration of unutilized degraded land b)reduction of methane emission in paddy cultivation c)organic farming d)carbon sequestration and other eco-friendly technologies. In this connection we must consider IAASTD recommendations to establish fruitful collaboration between formal and informal science. In this process we may be able to find out innovative indigenous technical knowledge systems, essential to face these challenges. To conclude, we have to retool our present energy intensive technologies by replacement with 'low input eco-friendly ones' whereas 'Integrated crop-livestock-fishery system' seems to be ideally suited to small/marginal farmers to earn livelihood in a sustainable way.
