Global: Jurnal Politik Internasional

Volume 10 | Number 1 Article 3

September 2010

ECOLOGICAL DISASTER: FUTURE FOOD SECURITY IN PERIL

Reshmi Banerjee
SOAS Centre of South East Asian Studies, reshmibehakraborty@yahoo.in

Recommended Citation
Banerjee, Reshmi (2010) "ECOLOGICAL DISASTER: FUTURE FOOD SECURITY IN PERIL," *Global: Jurnal Politik Internasional*: Vol. 10 : No. 1 , Article 3.
DOI: 10.7454/global.v10i1.272
Available at: https://scholarhub.ui.ac.id/global/vol10/iss1/3

ECOLOGICAL DISASTER: FUTURE FOOD SECURITY IN PERIL

Reshmi Banerjee

Post-Doctoral Research Fellow Department of International Relations,

University of Indonesia

Email: reshmibchakraborty@yahoo.in

Abstract

Artikel ini bermaksud untuk melihat lebih seksama hubungan yang kompleks antara agrikultur dan ekologi. Kesuksesan agrikultur adalah penting, tidak hanya untuk ketersediaan pangan, tetapi juga untuk menciptakan kerangka keamanan pangan yang 'sustainable'. Keamanan pangan bangsa hanya dapat diciptakan jika kita merawat ekologi yang berdampak dan mendukung produksi agrikultur. Sayangnya, eksploitasi berlebihan terhadap sumber daya alam menciptakan masalah bagi kita. Artikel ini bertujuan untuk melihat masalah ini dengan mengeksplorasi kondisi ekologis Punjab dan West Bengal, India. Aspek penurunan 'water table' dan 'forest cover', 'water logging', serta degradasi tanah dipelajari bersama dengan dampak ekspansi aktivitas non-agrikultur terhadap ekologi dan keamanan pangan di masa depan. Pemerintah India dengan kebijakan dan institusi akar rumputnya, serta organisasi non-pemerintah dengan programnya yang inovatif telah berusaha memperbaiki kondisi ekologi. Pendekatan kebijakan terintegrasi, program yang menyatu dan 'sensible' di tingkat distrik, serta partisipasi masyarakat yang lebih besar dapat memperkuat usaha perbaikan ekologi dalam jangka panjang untuk keamanan pangan bangsa.

Keywords : Food Security, Green Revolution, Special Economic Zone Panchayats, Taragram.

Introduction

India is today witnessing a paradoxical situation in which a growing economy is simultaneously accompanied by a large scale impoverishment. The desired momentum of achieving the ultimate goal of 'growth with equity' has not yet been reached. It appears that targets are set in terms of percentage of growth in national income and less emphasis is laid on the social objectives. Amit Bhaduri argues that we must strive for 'Development with Dignity' which implies not only a higher growth rate but development in which growth and distribution are integrated into the very same process.[1] The process of growth seems to be proceeding on a path which is denying the basic entitlements to the common man.

One of the most important entitlement that any person needs to be provided with is that of food which is the foundation along with water for our survival. Guaranteed as a human right in international covenants, freedom from hunger or access to adequate food and nutrition is generally perceived as a constitutional right in India. This has been mandated by extended interpretation of right to life (Article 21) in the Indian constitution. India has had a food policy and launched various schemes to address the needs of food and nutrition. However the country has also seen in recent times, deaths caused by starvation in different parts of the country and the trade liberalization of the last decade (1990s) and the policy changes have not made things easier as it has consistently attempted to decrease the government's role in ensuring food security. Meanwhile there have been judicial interventions along with public pressure which has consistently tried not only to uphold the right to food but also help in increasing our consciousness.

The Right to Food Campaign along with the Right to Information Act has generated awareness in India and created a stir in society and is an effort from civil society to ensure that our basic rights are protected . In the campaign are a number of citizen groups who share a common interest in pressurizing the state to fulfill its constitutional duties. The Right to Food Campaign has grown over the years. It all began with a public interest petition being filed in the Supreme Court by the People's Union for Civil Liberties (PUCL). This petition demanded that the stocks which had been accumulated in the government's food warehouses should be used to meet the endemic conditions of scarcity and deprivation in the country. The judicial intervention was accompanied by public pressures too. The Jan Sunwais (or public hearings) have become part of the struggle for the right to information and is helping in increasing the consciousness and awareness of the common people regarding their legal right and it also leads to the state being accountable and responsible for its actions. This campaign could turn into a mass movement and thus it becomes important for the government to relook at the existing food policies to ensure a food secure nation.

Food Security encompasses three important aspects of food availability, food accessibility and food absorption. Food security has been interpreted as physical and economic access to food at all times and at affordable prices to ensure a healthy and active life. Production of surplus food will not ensure total eradication of under-nutrition. It has to be supplemented by generation of sufficient employment opportunities so that all households have the purchasing power for assured economic access to food. Thus employment or livelihood security is an essential element of a comprehensive strategy for food security.

Food availability is a function of not only domestic food grain production but also imports/exports. Also the future food availability situation is dependent on the capability of the country to feed itself in the coming years and that is dependent on ecology. Long term food insecurity can occur if we do not take care of our ecology. This article is going to look at the aspect of *ecology* and examine the two Indian states of *Punjab* (in the North West part of India) and West *Bengal* (in the eastern part of India). Both the states are agriculturally fertile states of India but have suffered in the recent years from major ecological problems, which if left untreated can be a recipe for disaster.

1. Ecology

Concerns have been raised / expressed about the ability of the country to feed itself in the future. The Food Insecurity Atlas of India states that environmental degradation, soil degradation and climatic change are longer term threats to sustained productivity. Potential food insecurity may arise out of unsustainable livelihood and production practices. These lead to deforestation and degradation, soil erosion, etc. Sustainability is not limited to food production but also includes environmental sustainability. Practices which make a state food secure at present may lead to food insecurity in future if there is overexploitation of non-renewable natural resources.[2] Level of ground water exploitation, percentage of area under forests, total degraded land, etc., need to be looked at when one is considering ecology. The national average of forest cover is 23 percent. The forest cover needs to be protected in order to guard against depletion of top soil, allow percolation of water into the soil and stop desertification. The forest cover has declined over time due to cutting of trees and sometimes due to degradation.

Ground water has been constantly depleting with the water level going down day-by-day. Some of the reasons for this are the availability of cheap electricity for agriculture and lack of alternative sources of water for households and industries. Also water management has been poor in India.[3] Conserving and enhancing the ecological foundations essential for sustainable advances in production and productivity are of utmost importance. Any policy on land, water or forests cannot be viewed in isolation. One finds that prime agricultural lands have been degraded as lucrative commercial enterprises have led to change in land use and agricultural lands have been increasingly shifting to non-agricultural uses especially in the vicinity of urban areas. There should be laws guiding land use but one finds that even the 10th Five Year Plan of India (2002-2007) and its allocation to watershed management was

woefully inadequate.[4] More than half of India's cultivable area is rainfed and much of it is under severe water-stress. Also programmes are being implemented by several departments with similar objectives but different operational guidelines and also different cost norms which is not conducive to operational efficiency.

1.1. Punjab and West Bengal: Ecological Problems

Punjab (in the the north-west of India), spearheaded the Green Revolution (technological revolution) in the 1960s in India. During the Green Revolution, all farmers were applying the latest technology (including high yielding variety seeds, commercial fertilizers, tubewells, pumping sets and machinery for farm operations) and these led to a number of changes like major increase in productivity and consequently production of wheat and paddy, substantial increase in the incomes of farmers, availability of basic infrastructure like banks, communication in rural areas, changes in socio-economic structure of the rural areas etc.[5] But Sutapa Lahiry points out that the Green Revolution created serious regional imbalances in the production of cereals , growing and increasing pauperization of the marginal and small farmers, increase of class conflict between landowners and landless laborers , sharpened social cleavages etc i.e. clash between Jat-Sikh landowners and Hindu backward and Scheduled Caste landless agricultural laborers etc.[6]

In the 1980s, there was stagnation of yields accompanied by increasing costs of cultivation, the percentage of cultivators declined and landless laborers increased. The biggest problem was that the state's farming sector had ended up growing only two crops – wheat and rice – which accounted for as much as 71% of the gross cropped area. The intensive production has also led not only to monocultures in general in the state due to rice and wheat rotation and within these two crops in particular, but also higher incidence of pests and diseases. This has led to ecological problems: decline in water table, water logging, soil salinity, micronutrient deficiency and pollution due to burning of crop residues of paddy and wheat after mechanical harvesting of these crops. Realizing these problems, the state government appointed in 1985, the Johl Committee to recommend policy changes and this committee recommended diversification within farming away from wheat – paddy rotation to the extent of 20% in favour of fruit and vegetable, fodder and oilseeds crops. However one finds, that no other crop has been able to compete with wheat and paddy on assured profitability grounds and thus the reluctance of the farmers to grow anything else (other than wheat and rice).[7]

Punjab has been facing ecological problems due to overexploitation of resources. P.S. Rangi and M.S.Sidhu comment that a stage has been reached when the state needs to have a careful look at the available ground and surface water resources and plan its cropping pattern in a manner which ensures a clear balance between the available surplus of water and its potential demand . The future production strategy should be based on maximization of output per unit of water used per unit time.[8] The state is facing not only the problem of falling water level over vast areas in the central Punjab but water-logging in some parts of south western districts whereas underground water is brackish. The water logging has had its impact on the cropping pattern in this belt. Cotton which was the principal kharif crop [9] of south-western region is being replaced by paddy at a very fast rate. This problem of water logging has its social, economic and political implications in the region. There are press reports from time to time that many well off farmers have become daily wage earners due to the menace of water logging. Above all, the quality of ground water varies a great deal from place to place. The water quality ranges from fit to unfit for irrigation. Actually, variations in the groundwater quality are to such an extent that in the same village, zones of fit, marginal and unfit water categories can be observed. The agricultural scientists, policymakers, administrators and farmers have to take this problem seriously and any delayed action in this regard will be suicidal for the agrarian economy of the state.[10]

Ground water is dropping by 30 cm every year and the falling water table has nudged out centrifugal pumps in favour of submersible pumps which are 5-6 times more expensive than the first. To lift the same quantity of water from 10 metre depth, twice the power is required, for lifting water from 15 metres, three times more power is required.[11] The state also has abnormally low forest cover of 5.5% (much below the national average). Punjab is removing more subsoil water than is being replenished and G.K.Chadha , an expert on Punjab agriculture points out that Punjab has been suffering from soil depletion and land degradation (due to monocultures) and decline in water table . According to him, out of the 118 development blocks in Punjab, 85 blocks have witnessed sharp decline in water table.[12] Profit margins of the farmers have come down , crop yields have stagnated , excessive use of fertilizers and chemical pesticides and growing the same crops again and again have taken a toll on the soil resource , increasing indebtedness etc have lead to a precarious situation whereby many farmers have resorted to suicides .

The state of *West Bengal* (eastern part of India), is endowed on the other hand, with rich natural resources (large areas of good alluvial soil, abundant surface water and ground

water resources) and good rainfall. It experienced a radical change in the late 1970s and the acceleration in its growth occurred not due to its technology, but due to its institutional changes like agrarian reforms and revitalization of the panchayati raj institutions (grass root democratic institutions). The benefits went mainly to the small and marginal farmers and agricultural output began to grow very rapidly in the 1980s. The growth occurred due to a combination of changes like redistribution of land, security of tenure, public investment, irrigation and increased agricultural wages. Unlike Punjab which had a more mechanized capital intensive agricultural base, West Bengal had a more labour intensive agriculture. But West Bengal, just like Punjab, also faced ecological problems, lack of credit availability and lack of access to crop loans, rising input costs for seeds, fertilizers, water and electricity, falling farmgate prices of food grains, inadequate investment in infrastructure such as roads as well as irrigation, and declining agricultural growth in the 1990s.

There is some evidence that in West Bengal, the water table is not being replenished and the scope for expanding further the diesel tubewells and canal irrigation seems to be relatively limited. The switch to high yielding varieties can continue for a few more years but with 60%-70% of acreage already converted, it will not be for long. Also West Bengal is falling behind the rest of the nation in terms of water management. Also floods have become increasingly frequent in West Bengal with devastating consequences for farmers and the state government needs to be much more concerned with flood control.

As per the West Bengal Human Development Report, 2004, the relatively small expansion of forest area accompanied by declining area of land under miscellaneous tree groves and permanent pastures and other grazing land (which declined by 46.8% even over the period 1996-97 to 2000-01) may lead to serious environmental consequences such as loss of top-soil, biodiversity, livestock carrying capacity etc unless compensated by growth of forest biomass. As the agricultural land is not available for expansion of forest cover, it is only the cultivable wastelands and part of the fallow land other than current fallows which are the available potential areas on which forest cover can be expanded.[13]

The state also suffers from other problems like soil erosion, soil salinity, soil depth, drainage and water logging. They have important implications for land use planning. Two categories of soil degradation in West Bengal can be identified: soil degradation due to displacement of soil material mainly through water erosion. b) Physical and chemical deterioration of soil due to water logging, flooding and salination. Forests constitute 14% of

the geographical area but the state is deficient in forest cover compared to the national average of 23%. Moreover the land use pattern in rural and urban West Bengal suggests that the aggregate demand of water may in future far exceed the endowment in a given location. Inefficient use and waste of water are major and common problems encountered in all irrigation command areas. The lack of development of field channels also contributes to wastage of water besides large losses of water due to seepage. Many of the irrigation command areas have no facility for draining out excess water and so water logging is a common experience. Both surface and ground water resources in West Bengal have been increasingly getting polluted in the rural and urban areas.[14]

2. Effect on Food Security

Both Punjab and West Bengal contribute to the national food grain availability (especially Punjab) and any ecological problem affecting these two states, in turn, affects the food security of the nation especially future food availability. Besides ecological constraints, the shift towards growing non-cereals and diversification has also resulted in declining per capita availability of food grains especially cereals. In Punjab, one notes that there has been the introduction of contract farming but Devinder Sharma says that what makes contract farming questionable is the highly intensive cropping pattern that requires 15 to 20 times more intake of chemical inputs. The more the chemical inputs, the more is the water requirement making contract farming unsustainable. It renders the land unfertile in four to five years, thereby adding on to the farmer's woes.[15] Moreover, many of the farmers are dissatisfied by contract farming as commitments made of lifting of the produce at an agreed price are not being kept and companies delay / default on payments.

In West Bengal too, there has been a decline in production as well as the rate of growth of food grains has slackened, percentage of agricultural laborers has increased and cultivators declined. Expansion of non-agricultural economic activities along with growing financial difficulties of cultivation has created a situation where a focus on non-agricultural activities has become preferable for many small- holder rural households. According to the West Bengal Human Development Report, 2004, it has been seen that over the last two decades, the net sown area and its share in total area have remained more or less the same in West Bengal. There has been an appreciable decline in barren and uncultivable land by 41% which can be explained mainly by the increase of 20% in the area under non-agricultural uses.[16] And non-agricultural uses means that ecology pays the price as many a times, prime

agricultural lands have been taken over for non-agricultural uses. Also the expansion of alternative activities like prawn farming and fisheries has ecological implications which cannot be dismissed and which raise questions about the future effects. The policy of establishing SEZ (Special Economic Zones) became very controversial in West Bengal as it was argued by the farmers and the concerned rural dwellers that cultivable land was being transferred from agriculture to industry without any concern for future food security or ecology. Land acquisition has become a political issue with protests by those being dispossessed of their lands and a number of political parties opposing large scale acquisition.

3. Initiatives Undertaken

Various initiatives have been taken by the Government of India, the panchayats and the non-governmental organizations to improve the ecological conditions.

3.1. The Government of India

The Government of India has implemented programmes over the years to improve and develop degraded lands. The Drought Prone Area Programme (DPAP), The Desert Development Programme, The Integrated Wasteland Development Project (IWDP), The National Watershed Development Project in Rainfed Areas all have been implemented and are still in progress. The DPAP seeks to control and minimize the adverse effects of drought on production of crop and livestock, productivity of land, water and human resources. IWDP seeks to check land degradation and increase biomass availability by putting wastelands under sustained use. The National Watershed Development Project in Rainfed Areas focuses on conservation, development and sustainable management of natural resources including their use. Its main objectives are enhancement of agricultural production and productivity in a sustainable manner and restoration of ecological balance [17] Watershed development can be sustained in the long run only through social mobilization and capacity building. These programmes are important for creating conditions whereby sustainability of food availability can be maintained. The question of livelihoods and the role of land and water in the provision of that livelihood should be brought to the centre stage in watershed development. Also thirty-three percent seats in the panchayats are reserved for women and the panchayats have a role in watershed management programmes, thus, platform for women's participation in watershed projects exists.

It is preferable if all watershed projects are implemented by a single department / agency within a common framework. At the very least, it is imperative that the guidelines and

the cost norms are similar so that convergence is possible at the district level. Evidence suggests that people's involvement in watershed projects provides for capacity building and greater commitment on the part of the community to construct and maintain structures created in the course of the project. One finds that wherever there has been participation at the local level, things have improved for the better, thus democratic participation at the grass roots can improve not only the chances of a better food security framework (by improving availability) through better monitoring of the public distribution system but also improve and strengthen the efforts being chalked out for the improvement of ecology in the long run for a sustainable food secure nation.

3.2. Panchayats

Panchayats (India's democratically elected grass root institutions) at the village level and Non-Governmental organizations can make a real difference. These not only help in raising the awareness among the rural masses but they also help in monitoring and implementing the various programmes. Both Punjab and West Bengal have their own sets of programmes depending on the problem existing in the state. But the difference between the two states are as follows: in West Bengal, the panchayats constitute the foundation on which rural development is based. Panchayat members are responsible for forestry management and land reclamation, improvement in land use patterns and farming techniques etc. The empowerment of the people, democratic decentralization and participatory management processes are the three planks of the panchayati raj system in West Bengal. In Punjab, the panchayat system needs to develop further. Also as compared to West Bengal, in Punjab the non-governmental organizations (NGOs) and other local level community institutions are very few in number.

3.3. Non-Governmental Organizations

There are various organizations that are committed to enhancing both food and livelihood security along with improving the access to basic resources. IDRC (International Development Research Centre), New Delhi recognizes that environmental degradation is linked with widespread poverty and inequitable access to basic resources. One of its major programme is environment and natural resource management and it builds on community knowledge and participation to inform policy and institutional framework that govern resource management.[18] Care India , Development Alternatives etc are all making their small but important contributions to natural resource management which in turn can guarantee us a

better and more sustainable food secure nation . The organization – Development Alternatives has different branches which deal with different aspects like the 'Rural Environment Group' which offers planning and management , capacity building , monitoring and evaluation and policy advice services in the areas of land and water management , sustainable agriculture and participatory resource management . The organization encourages organic cultivation and it has created 'Tara gram' (TARA village) in an area called Orchha in the state of Madhya Pradesh in central India which is self sufficient in water , achieved through sustainable land and water management practices and also it is self –sufficient in power . The main activities of Taragram covers a) community mobilization and empowerment (village committees have been mobilized to manage community assets like forests, common lands and water supply systems) and b) sustainable natural resource management (water harvesting and conservation is carried out and farmers are trained to enhance productivity through improved agricultural practices and diversification into agro-forestry , horticulture and floriculture).[19]

However in India, food policies are shaped at the Central level by people who are less aware of the problems and difficulties at the local level and thus there is a wide gap between policy making and policy implementation. One needs to have a food policy that has a popular appeal and satisfies various social interests. It is a challenge for the Government of India to make a food policy which is effective and politically viable. While the Central Government should be responsible ultimately for national food security, the implementation of many programmes including the public distribution system and the natural resource management remains a state subject. The role of the Centre in providing financial and infrastructural support to the states cannot be ignored under this system. It will continue to play a pivotal role in all centre-state negotiations. The better and stronger the framework of cooperative federalism between the two, the better the chances of success of many of the programmes related to food security and ecological management.

Also Climate change can have a major impact on the future food availability situation. The Prime Minister's Council on climate change was set up in June 2007 with the objective of ensuring effective coordination and implementation of all national action plans. India released its National Action Plan on Climate Change (NAPCC) on June 30, 2008 to outline its strategy to meet the challenge of climate change. The National Action Plan advocates a strategy that promotes, firstly, the adaptation to climate change and secondly, further enhancement of the ecological sustainability of India's development path.[20]

4. Directions for the Future

Indian Ministry of Environment and Forests is responsible for planning, promoting, coordinating and overseeing the implementation of environment and forestry programmes. The main activities include the conservation and survey of the flora and fauna of India, forests and other wilderness areas, prevention and control of pollution, afforestation and land degradation mitigation. Indian Agricultural Research Institutes have been strongly propagating that widespread agricultural development is possible only if attention is paid to local endowments of land, climate and water and appropriate agro-climatic development strategies.[21] The Approach Paper to the 11th Five Year Plan talks of the need on recognition for strategies specific to different agro-climatic zones. The Atlas of the Sustainability of Food Security in India has a 'Sustainable Food Security Compact', a nine –point action plan for every state and union territory. The action points refer to population stabilization, land resources conservation and enhancement, ensuring water security system, conserving and restoring forests with community participation, strengthening biodiversity, managing common property resources, intensifying crop and animal production in a sustainable way and forming a coalition for sustainable food security in every state .[22]

The National Commission on Farmers has also emphasized on better ecological and sustainable practices. Farmers in each area and village should come together and along with panchayats and local level community organizations try to adopt practices in both farm and non-farm (keeping in mind the local conditions) for sustainable livelihood. Nira Ramachandran comments that a 'sustainable livelihood approach to food security is necessarily people – centred and must begin with an investigation of the assets which people have , the objective that they hope to achieve and the livelihood strategies that they adopt to achieve them .[23]

5. Conclusion

Since the 1992 Earth Summit in Rio, it is generally accepted that the agriculture and environment agendas are inseparable. Degradation of natural resources undermines the basis for agricultural production and increases vulnerability to risk, imposing high economic losses from unsustainable use of natural resources. We cannot succeed in attaining the long term goal of 'agriculture for development' without more sustainable use of natural resources – water , forests , soil conservation , genetically diverse crops and animal varieties, and other ecosystem services . At the same time, agriculture and food security are often the entry points

for interventions aimed at environmental protection. The intricate links between the agendas of agriculture and environment require an integrated policy approach. Getting the incentives right is the first step towards sustainability.[24]

Finally good governance is essential. Governance is all about creating new rules and institutions and changing old ones in order to make sure that there is equal participation by people in decision making and implementation, a vigilant civil society, free press and access to information , rule of law , efficient delivery system etc . Decentralization – the transfer of political, economic, administrative authority to lower levels of government is important and local government institutions need to set priorities, thus local political leadership is important. Special provisions need to be in place to reduce elite capture and social exclusion. One needs to improve transparency, accountability and evaluation procedures to make sure that the policies and programmes work for the benefit of society. The state, the market and the civil society needs to work in perfect harmony to achieve the balance between a vibrant agriculture (supporting food availability and food accessibility) and a sustainable ecological base cradling it.

References :

Agriculture for Development', *World Development Report (*2008), Washington , World Bank .

Alagh , Yoginder K (1996), *Land and Man – Essays in Sustainable Development* , New Delhi , Har Anand.

Annual Report 2004- Institutions Systems Branch , Development Alternatives , New Delhi .

As per interview with Professor G. K . Chadha , New Delhi , October 5 , 2005 .

*Atlas of the Sustainability of Food Security in India (*2004), World Food Programme and M.S. Swaminathan Research Foundation , Chennai .

Bawa , R.S (2000), " Agrarian Prosperity in Punjab and its Socio-political Implications" in Bawa , R.S and Raikhy , P.S (eds), *Punjab Economy – Emerging Issues* , Amritsar , Press and Publications Department.

Bhaduri , Amit (2005), *Development with Dignity – A Case for full employment* , New Delhi , National Book Trust .

Economic Survey (2008-2009), Government of India , Ministry of Finance , Department of Economic Affairs , Economic Division .

Food Insecurity Atlas of Rural India (2001), World Food Programme and M.S . Swaminathan Research Foundation , Chennai .

Lahiry , Sutapa (2001), " Distress in Punjab Agriculture under the WTO regime : A Brief Note" , *Mainstream* , September 1 .

Ramachandran , Nira (2001), " Sustainable Livelihood and Economic Access to Food" in Asthana , M.D and Medrano , Pedro (eds), *Towards a Hunger Free India – Agenda and Imperatives* , New Delhi , Manohar .

Rangi , P.S and Sidhu , M.S (2000), " Problems and Prospects of Agriculture in Punjab" in Bawa , R.S and Raikhy , P.S (eds), *Punjab Economy - Emerging Issues* , Amritsar , Press and Publications Department.

Sharma , Devinder (2006), " Villages for Sale , rural despair growing" , *The Hindu* , Delhi , January 31.

Singh, S.P (2004), "From the Fields", July 30, www.indianexpress.com/print.php?content_id=52011

Singh , Sukhpal (2000), " Crisis in Punjab Agriculture" , *Economic and Political Weekly* , June 3 .

Supporting innovative research for development in South Asia (2001), International Research Development Centre , New Delhi .

The Mid Term Appraisal of the Tenth Five Year Plan (2002-2007), Planning Commission , Government of India .

Towards a Food Secure India , National Food Security Summit (2004), Chennai , M.S. Swaminathan Research Foundation , February 4-5 .

West Bengal Human Development Report (2004), Development and Planning Department , Government of West Bengal .

Endnotes

[1] Bhaduri , Amit (2005), *Development with Dignity – A Case for full employment* , New Delhi , National Book Trust , p.11.

[2] *Food Insecurity Atlas of Rural India* (2001), World Food Programme and M.S . Swaminathan Research Foundation , Chennai , pp. 16-17.

[3] *Ibid.*, pp.17-18.

[4] *Atlas of the Sustainability of Food Security in India (*2004), World Food Programme and M.S. Swaminathan Research Foundation , Chennai , pp.215-216.

[5] Bawa , R.S (2000), " Agrarian Prosperity in Punjab and its Socio-political Implications" in Bawa , R.S and Raikhy , P.S (eds), *Punjab Economy – Emerging Issues* , Amritsar , Press and Publications Department , pp. 37-38.

[6] Lahiry , Sutapa (2001), " Distress in Punjab Agriculture under the WTO regime : A Brief Note" , *Mainstream* , September 1 , pp.17-18.

[7] Singh , Sukhpal (2000), " Crisis in Punjab Agriculture" , *Economic and Political Weekly* , June 3 , p.1890.

[8] Rangi , P.S and Sidhu , M.S (2000), " Problems and Prospects of Agriculture in Punjab" in Bawa , R.S and Raikhy , P.S , *op.cit.*, p.9.

[9] Kharif crops are also known as the summer or monsoon crops in India. They are usually sown with the beginning of the first rains in July during the Southwest monsoon season.

[10] *Ibid.*, p.15.

[11] Singh , S.P (2004), " From the Fields" , July 30 , www.indianexpress.com/print.php?content_id=52011

[12] As per interview with Professor G. K . Chadha , New Delhi , October 5 , 2005 .
[13] *West Bengal Human Development Report* (2004), Development and Planning Department , Government of West Bengal , p.176.
[14] *Ibid.*, pp. 179-183.
[15] Sharma , Devinder (2006), " Villages for Sale , rural despair growing" , *The Hindu* , Delhi , January 31.
[16] West Bengal Human Development Report (2004), *op.cit.*, pp. 175-176.
[17] *The Mid Term Appraisal of the Tenth Five Year Plan (2002-2007)*, Planning Commission , Government of India , p.255.
[18] *Supporting innovative research for development in South Asia* (2001), International Research Development Centre , New Delhi , pp. 3-4 .
[19] *Annual Report 2004 – Institutions Systems Branch* , Development Alternatives , New Delhi , pp. 1-3.
[20] *Economic Survey (2008-2009),* Government of India , Ministry of Finance , Department of Economic Affairs , Economic Division , p. 281.
[21] Alagh , Yoginder K (1996), *Land and Man – Essays in Sustainable Development* , New Delhi , Har Anand, pp. 196-197.
[22] *Towards a Food Secure India , National Food Security Summit* (2004), Chennai , M.S. Swaminathan Research Foundation , February 4-5 , pp. 28-32.
[23] Ramachandran , Nira (2001), " Sustainable Livelihood and Economic Access to Food" in Asthana , M.D and Medrano , Pedro (eds), *Towards a Hunger Free India – Agenda and Imperatives* , New Delhi , Manohar , p.208.
[24] *'Agriculture for Development', World Development Report (2008)*, Washington , World Bank , p. 199.