Synopsis
Indian Agriculture – Trends in Food grains Production, Implications on Food Security in India – Post 1980’s Study

Doctor of PHILOSOPHY
In
ECONOMICS

BY
NOOKATHOTI TRINADH

DEPARTMENT OF ECONOMICS
School of Social Sciences
UNIVERSITY OF HYDERABAD
HYDERABAD – 500046
FEBRUARY 2012
Chapter I

Introduction

1.1 Definition of Food security:
The term Food Security, as understood today, implies both physical and economic access to balanced diet for each household and for all members in a household. The Rome Declaration on World Food Security and World Food Plan of Action 1996, defined food security in unambiguous terms as "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO-1996).

India is the only Asian country other than Bangladesh and Yemen that have been under severe food shortages in the world. The rest of the countries come from Africa. About 42 per cent of underweight children claim India as their home (UNO Hunger Force). 47 per cent of children under 5 years old are underweight, 45 per cent are stunted, and 46 per cent have severe malnutrition (wasting: disproportionate growth) (National Family Health Survey III 2005-06). India is also a home for a large number of people affected by malnutrient deficiency (iron, iodine, vitamin A. This hidden hunger contributes to low human capital through reduced cognitive ability of the people, and low productivity of labour.

We have bigger challenges ahead in future and we have to shoulder the responsibility of more than 380 million poor people that still remain undernourished while the global undernourished figure is 925 million\(^1\), indicating that more than \(1/3\text{rd}\) are in India. 65 percent of the world's hungry live in only seven countries namely India, China, the Democratic Republic of Congo, Bangladesh, Indonesia, Pakistan and Ethiopia\(^2\).

In today’s world the poorest of the poor families in the world spend 80 per cent of their total income on food grains and inadequate purchasing power deprives them from availing food in sufficient quantity. The shocking news is that, today hunger is on the rise. It is surprising that in 21\(^{st}\) century one child under the age of five years will die every five seconds from hunger related diseases. Hunger may kill more people than all wars fought in the coming years. But unfortunately there seems to be a very less serious war against this.

\(^1\) FAO 2010
\(^2\) Ibid
I.1 India’s Global Rank in Major Agricultural Crops

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area</th>
<th>Production</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice (paddy)</td>
<td>1</td>
<td>2</td>
<td>52</td>
</tr>
<tr>
<td>Wheat</td>
<td>1</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>Coarse Cereals</td>
<td>3</td>
<td>4</td>
<td>125</td>
</tr>
<tr>
<td>Pulses</td>
<td>1</td>
<td>1</td>
<td>138</td>
</tr>
</tbody>
</table>


Table shows that, though India has the maximum area in the World for the production of Rice and Wheat, but ranks second in their production, unfortunately it also ranks at 52\(^{nd}\) and 38\(^{th}\) in terms of yield per hectare of rice and wheat respectively. Even areas in the cases of pulses (1st), India is ranking very much high in the World, but in terms of production and yields wise, we have been lagging very much behind many of the countries in the World.

1.2 Objectives:

1. To Study the trends in food grain production after 1980s at All India level and analyze the impact on Food security
2. To observe the trends in per capita availability of food articles and implications on food security.
3. To study the impact of Free trade environment over domestic food production and Food Security.
4. To examine the future demand projections of Food grains.

1.3 Methodology:

In order to establish these objectives, secondary data, we can compare the aggregate growth rates of food grain production during the prescribed period, in this process, as Rice and wheat are our primary ingredients in diet, we try and restrict ourselves mostly with the crops of Rice, wheat, and pulses. We also try to observe the direct and indirect factors that influenced their production over the said period. Along with these observations, we will also take into account the per capita availability of different food articles and minimum and maximum adequacy levels. Here we mostly confine ourselves to the study of aggregate or national indicators with the observation of major states performance. We also study the population and growth rates of food grains over the years, particularly in comparison with food grains growth rate.
1.4 Data Sources:
At the end we try to come up with some appropriate and practical suggestions with the help of interpreting and evaluating the related data in relation to our objectives. For this purpose various reliable and accurate secondary sources of data like Ministry of Agriculture and Statistics, GoI, Directorate of Economics and Statistics, GoI, Govt Andhra Pradesh, National Sampling Survey Organisation (NSSO) surveys of various rounds, Economic survey of India of various years, Reserve Bank of India (RBI) Agriculture Statistics, Food and Agricultural Organisation (FAO), World Food Programme (WFP), Central statistical organization (CSO) International Food Policy Research Institute (IFPRI), World Bank, Ministry of Agriculture and Distribution, Ministry of Consumer Affairs, Food and Public Distribution, Ministry of Health and Family Welfare, National Family Health Survey (NFHS), National Nutritional and Monitoring Bureau (NNMB) etc. ICAR, IARI.

1.5 Statistical Tools Applied:
In order to substantiate our objectives more emphatically, we take data pertaining to Rice, Wheat, Pulses and also Total food grains production as a whole since the year 1981-82 till 2009-10. In the same way we also take the data of per capita availability of different food grains, population data during our study period. This data is obtained for both at the National level and also of major important states. We analyse this data and calculate the Annual compounded growth rates, and also Standard Deviation and Coefficient of Variation. And in order to ascertain the mutual relationships regarding production we apply least squares method.

Chapter II
Literature Review
The chosen area of research for my doctoral study is “Indian Agriculture – Trends in Food grain Production and Implications on Food Security in India – A post 1980s Study” for which the following literature has been reviewed, comprising of 40 different papers, articles and books of various eminent authors. As I have taken most of the literature from different books, related to my study area, as they are very rich and vast in explanation, have tried the most to condense them in a way not miss the author’s primary objective. Based on the dimension of the different authors’ explanations, the review has been classified into different sections, like, 1.Literature that addressed the issue from the demand Point of view 2.Literature that addressed the issue from the Supply Point of view. 3. And the explanations
particularly related to some countries. 4. Food Security under Free Trade and Economic Reforms. 5. Presentation of the Intensity of Indian food security situation in general.

Chapter III

Composition and Conceptual Framework of Food insecurity – Prevailing Trends

In this chapter, we try to analyse and establish the extent of food insecurity in India through observation, presentation and analysis of various parameters. Though our objective is to analyse the role of production in determining Food security, it is also very pertinent and pre requisite to observe the symptoms of food insecurity through different prevailing facts at aggregate level in order to establish and analyse the issue of food insecurity.

The concept of food security in its wider connotation comprises of four entities: 1) Availability of Food 2) Household Entitlement to food 3) Stability in the supply of food throughout the year; 4) Protection against malnutrition.

Impartial agencies, such as UNICEF, have started that in the area of nutrition India’s record is worse than that of some of the countries of Africa. With the rising income Engel’s law starts operating, i.e., expenditure on food as a proportion of total income declines, and expenditure on food grains declines even faster. Also, so long as a vast number of people are below the poverty line the increase in their income up to certain threshold would fuel demand for food grains. Kumar suggest that the demand for food grains by the year 2030 will range between 260 million tons to 264 million tonnes depending on the growth in per capita income. As is well known, India is now producing enough food, which if equitably distributed, can meet the calorie requirements of the citizens. However, the fact of the matter is that the available food is not equitably distributed and as a result the lower 30 per cent of the households do not have adequate intake of calories.

The continuing growth in population and incomes appear to lead to a clear danger of India becoming a food grains importing country. It is the State’s obligation to subsidise the poor producers as well as poor consumers. This input subsidy is often known as ‘cheap input-cheap output’ policy. Neither fertilisers, nor irrigation, nor for that matter, power, is an unfamiliar input. The increasing use of the subsidised inputs is not contributing to

productivity at the margin. Marginal productivity of fertilisers and water applications is declining, largely because of weakness in the organisation and functioning of the extension system. There are better ways of transferring incomes to the producers such as by improving the income terms of trade.

3.1 Alarming Hunger Rates:

It is also worth pointing out that the percent share of calories from cereals which was 83.4 for the lowest expenditure groups has declined gradually to 55.2 in the highest expenditure group. Taking different states in India, these percentages are varied between 28.5 - Kerala, 62.6 - Bihar. The IMR (Infant Mortality Rate) ranged between 23.8 in Kerala and 99.9 in Uttar Pradesh. And 51.9 per cent of rural consumers with monthly per capita expenditure of less than Rs.265 and as high as 67.7 per cent of the urban consumers with monthly per capita expenditure of less than Rs.490 had inadequate calorie intake and 53.3 per cent of rural households and 61.9 per cent of urban households belonged to the monthly per capita expenditure groups with below average levels of adequate calorie intake.

3.2 Climate change:

It has caused poor harvests in different ways ranging from droughts in Canada and Australia to excessive rain in parts of the USA. Gradual melting of glaciers in Asia will cause massive damage to China and India, where perennial rivers such as Yellow, Yangtze and Ganges are flowing from such glaciers. It will reject the all the necessary irrigation water for both wheat and rice cultivation during dry periods. This is of global significance since China and India together produce more than half of the World’s wheat and Rice. Once again, official policy has been tardy in considering such problems, much lesser in addressing them.

This means that the number of hungry people actually increased in the world as a whole, and particularly for certain developing regions. The surprise is that the growing prevalence of hunger and food insecurity was associated with relatively high GDP growth in several regions, such as India and countries in Latin America. The contrast with east and south East Asia is a stark one, and points to the role of public policy in ensuring that aggregate income growth translates into better provision of basic needs such as food for the general population.

---

Chapter IV
Growth of Agriculture and Concerns of Food Security

“India cannot prosper without the prosperity of Agriculture”. In this chapter basically we try to examine the growth of agriculture during the period between 1981-82 and 2009-10, before and after liberal economic reforms, and also try study the prospective and challenges involved in today’s political and physical environment with regard to the food security.

Rice (65 per cent) and wheat (35 per cent) comprise majority of the Indian diet pattern. The unfortunate and sad part of it is that, most of the Indian agriculture still remains the "Gambling in the Monsoon" (only 40 per cent of cultivated land is irrigated). After facing severe food insufficiencies soon after the independence due to problems like lower production, famines and occurrence of wars, which continued till mid 1960’s. India could able to wake up from this menace and come up with innovative measures like Green revolution, which brightened the situation in terms of self sufficiency in food grain production to some extent. In any developing country it is natural that agricultural sector contributes major share in its GDP during the initial stages. But as the process of economic development starts making impact, gradually the dependence on agriculture both for livelihood as well as share in GDP would come down. But unfortunately the sad story in India is that though the share of Agriculture has come down in GDP, the amount of people who are dependent on agriculture has not come down significantly. Growth in Industry and Manufacturing sector has not been able to release the additional work force from agriculture. This kind of development cannot be termed as an inclusive mode of development. Before analysing the prospects and challenges involved in Indian agriculture as far as food security is concerned, it’s imperative for us to examine the expansion, relevance and evolution of Indian agriculture over the years.

4.1 Decreasing Farmers’ income and threat of Food Insecurity:

The main problem in the agriculture sector is not so much lack of production and productivity but assured and sustained increase in farmers’ income. The present marketing system is not farmer friendly, Government support and intervention to provide remunerative prices is dwindling and over all government investment in capital information in agriculture has not.

---

5Barah B.C (Aug 2007) : “Criticality of Rice and Wheat System in Sustainable Food Security in India – An Analysis”. Agricultural Situation in India -.
been sufficient to generate economic activities in rural sector as was done vigorously during green revolution in 1970’s and early 1980’s. These macro level factors can be energised in favour of the farmers but there are certain inherent constraints of the agriculture sector of the economy that will need a new look and policy to introduce changes to correct these constraints. Since 1990-91 with the liberalisation of economic policies, WTO membership from 1995 and agri-produce surpluses arising in the farm sector coupled with less than adequate intervention by the government, small farmers in particular found it difficult to compete in the market. The economic limitation of small operation has surfaced as a critical factor to get adequate and sustained increase in income. That calls for structural, organisational and institutional changes in managing the farm sector in India. What India needs now is the incomes policy for farmers. Agriculture policy oriented towards production and productivity alone is not going to provide sustained increase in income to farmers. Hence, new frame work for sustained increase in income is to be evolved.

4.2 Rich Agriculture and Poor Farmers:

The current situation of the farm sector in India is one of rich agriculture but poor farmers. On the one hand small farmers have made India self sufficient in food grains but by the end of the 20th century the farmers have become poor. Their average per capita incomes in absolute and relative terms declined over the period. This is a serious issue for the economy as no progress will be worth the name if 72 per cent of India’s population continue to face the grim situation of falling incomes.

Along with them in almost all the crops’ cultivation (in terms of cultivated area), India stands top in the world for eg: Number one in total irrigated area, number second in wheat and Rice, third in cereals and 1st in pulses, second in oil seeds, second in fruits and second in sugar cane and first in tea, jute and milk cultivation and he total area under cultivation is 142 million hectares. Out of this, 100 million hectares is dependent on monsoons for water. Average area under operational holding is 2 hectares and the total farmers having this area are 86 per cent. If India is the largest producer of several crops, it is also the country that has lowest yield per hectare for all crops. For eg: per hectare yield of paddy is 6.2 tonnes in USA and it is 2.9 tonnes in India, and for wheat it is 3.9 tonnes in China and 2.5 tonnes in India6.

---

It is very clear that India has become self sufficient in agri produce and can compete with rest of the world if developed countries reduce their subsidies to farmers. The area under irrigation has gone up during the last 30 years significantly and there is great potential to be tapped. Crop intensity\textsuperscript{7} is singular factor that has offset the disadvantage of small size of the farmers. Production structure is quite diversified. In terms of production it ranks first and second in the world for number of commodities. The cost of production continues to be high and farm labour contributes much for the increase in production. Though productivity is nearly the half the productivity by world standards, there is great potential to tap it by increasing the intensity of production. It is also to be understood that indiscriminate use of fertilisers and other chemicals may increase the productivity but there is danger of contaminating the produce with the chemical substances. The developed countries have realised the perils of this increased chemical productivity and are now going in for more of organic production even if the productivity comes down.

\textbf{Chapter V}
\textbf{Trends in Food grains Production and Self Sufficiency}

In this chapter we try to present the performance of food grain production in India and try to analyse the attainment of self sufficiency and challenges involved in it. More importantly, we try to analyse the factors that have determined the fluctuations in productions. For this purpose, we take up the food grain production data since 1980s, especially Rice, Wheat, Pulses and also total food grains together and try to draw the inferences. Based on these inferences we will examine the trends as well as causes, opportunities and challenges, and make appropriate projections. Therefore, we take up the data at an aggregate level and also most of important food grain producing states.

Our calculations in the planning Commission suggest that this 8 per cent growth in GDP requires growth of agricultural GDP to be around 4 per cent. In the 15 years after 1980, growth of agricultural GDP was around 3.4 per cent. This was lower than the 4 per cent growth needed, but it was sufficiently close to it to believe that a little more effort within the same strategy would yield the growth results we want. Since the periods following 1996 growth of agricultural GDP has declined to around 1.7 per cent. Underlying this slow down is a slowing down in the growth rate of yields per hectare in almost all crops. To move from

\textsuperscript{7} Cropping intensity = (Gross cropped area / Net sown area) x 100
this performance to the target growth rate of 4 per cent in the years ahead involves more than doubling of the existing underlying trend in agricultural growth.

5.1 Global Status of Indian Agriculture in Production:

Considering global context, after USA and China, India stands at 3rd place in the production of cereals. Considering the growth rate of population of 2.1 per cent between 1950-51 and 2006-07, the annual average growth rate of cereals was 2.5 per cent. To some extent, except occasionally, this has prevented food imports between 1976-77 to 2005-06. But unfortunately between 1990-2007, the growth rate of food grain production has come down to 1.2 per cent, during the same time the growth rate of population has increased to 1.9 per cent, showing a clear indication of decrease in food grain self sufficiency. At the same time, the per capita consumption of cereals had come down from a high point of 468 grams per day per person in 1990-91 to 444 grams per day per person in 2008-09, showing a clear decline of 05 per cent during this period.

5.2 Food Security in the post Liberalisation Era:

The developments that were taken place in the food security situation during post liberalisation period are... firstly, on the positive side, since the GDP and per capita income recorded fairly high growth rates during the 1990’s, the economic access of the population to food has certainly increased, on an average. But the growth rate of agricultural GDP shows a visible deceleration at 1980-81 prices. Higher growth was mainly because of the assured contribution of fruits and vegetables, since the growth rate of crop production registered a significant decline.

Thus the food security situation has deteriorated on many counts. Coming first to availability, food grains output has registered a significant decline during 1990’s. Therefore, the per capita availability of food grains has actually declined from an average of 485 grams/day during triennium ending (TE) 1990 to only 444 grams/day during TE 2008-09. But despite lower output, FCI accumulated huge stocks of food grains. The main reason for this is a perceptible decline in the demand for food grains is firstly because of diversification of food basket over time. But an important reason for decline in demand during the 1990’s is due to very large hikes given to rice and wheat prices under the pressure of surplus states
and also perhaps under the influence of international agencies. The result is that many poor households have been priced out and thus pushed away from food secured position\(^8\).

The tinkering with the PDS, making it targeted PDS and keeping the prices for the above poverty line (APL) public distribution beneficiaries very high (sometimes higher than the open market price) has contributed to a steep decline in off take. The exports of wheat and rice have also become unprofitable at the current price mainly because of the downward trend in international prices. On the other hand, the procurement of rice and wheat is increasing every year even during the years when aggregate output of wheat and rice has declined. The private sector also opted out because of higher prices and has depleted its stocks. All the emerging surpluses have, therefore to be procured by the FCI. The consequence is mounting stocks co-existing with unfulfilled demand for food grains.

The high price of food grains is the main cause of this disarray in the Indian food market is borne out by the fact that recently with the decision to reduce both BPL and APL prices in 2010; the off take has increased significantly. Further some, with the decision to give transport subsidy to exporters and allowing them to lift food grains at concessional prices, exports have also registered a notable increase. The result is that food stocks which had reached a level of 58.1 Million tonnes in Jan 2002 have come down by 48.2 MN tonnes in Jan 2003 and 25.2 MN tonnes in Jan 2004\(^9\).

The lesson is that one of the most important components of food security is a reasonable price at which all sections of the population, including the poor, can afford to purchase sufficient quantities of food to meet their food security requirements. Finally the most serious aspect of food management during the recent period is a deliberate attempt to erode the credibility of the food management system. This applies to PDS as much as to the policy for minimum support which is sought to be replaced by insurance..etc., putting the Indian farmer once again at the mercy of the insurance agents and the food security at stake.

---


5.3 Terms of Trade\textsuperscript{10} in Agriculture:

On the other hand, imports of some agricultural commodities, in particular, edible oils have risen at a very rapid rate with adverse consequences for oil seed farmers in the dry land regions of India. While liberalisation is expected to benefit Indian farmers through increase in exports, the harmful effect of cheap imports on the income of the farmers in some regions can also not be ruled out in future.

Indian farmers did derive some gain from exports during 1990’s. But, in this perspective, one has to remember that India’s exports shared only 5 per cent of value of agricultural output and 6.1 per cent of agri GDP with imports sharing 2.6 per cent of GDP in the year 2000-01. Consequently, in absolute terms, the gains from exports are only limited and only a very small proportion of the farming community in some regions has benefited from them. However, India has a large potential to increase its agricultural exports in a liberalised world once the developed countries agree to eliminate their subsidies.

Chapter VI
Demand and Supply Projections for Food Grains

In the following analysis we try to examine and present the studies that have exclusively focussed upon the projected demand for food grains in future at an aggregate level in India. Various eminent economists have used different tools to these projections keeping in mind of the projected increase in population as well as the demand for food grains. They have also taken into account other parameters like projected increase in income growth and tried to project the possible gap between demand and supply of food grains during the stipulated future period.

VI.1 Per cent Annual Growth rate of projected supply and Demand in 2026

<table>
<thead>
<tr>
<th>Food Items</th>
<th>Demand</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>1.55</td>
<td>1.01</td>
</tr>
<tr>
<td>Wheat</td>
<td>1.42</td>
<td>1.34</td>
</tr>
<tr>
<td>Total Cereals</td>
<td>3.17</td>
<td>1.45</td>
</tr>
<tr>
<td>Pulses</td>
<td>6.51</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Note: Growth rates are between base year and 2026. Demand Scenario of GDP growth at 9% is considred here. Source: “Demand – Supply Trends and Projections of Food in India – working paper No.209” by Surabhi Mittal, March -2008, Indian Council for Research on International Economic Relations (ICRIER)”.

The table shows that the projected growth rates of demand and supply for Rice and wheat lesser compared to total cereals, pulses, edible oil and sugar. It only shows that there will be

\textsuperscript{10} Terms of Trade is “ratio of prices received by the farmers (for the products sold by them) to the prices paid by them (for inputs and consumption goods purchased by them) to the prices paid by them (for inputs and consumption goods purchased by them)”
supply shortages in response to demand. It indicates that there will of scope for food insecurity in future. Rice and Wheat falling short of demand marginally, but Pulses and Cereals have been subject to extreme differences in supply and demand in future by the year 2026, as their demand will be falling short of supply.

Chapter VII
Data Analysis and Interpretation

VII. 1 India’s Population & Food grains: Compounded Annual Growthrates
(Between 1981-82 to 2009-10) (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>FG Production</th>
<th>Rice</th>
<th>Wheat</th>
<th>Pulses</th>
<th>Cereals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-82 to 2009-10</td>
<td>1.93</td>
<td>1.87</td>
<td>2.17</td>
<td>2.62</td>
<td>0.62</td>
<td>2.06</td>
</tr>
<tr>
<td>1981-82 to 1994-95</td>
<td>2.10</td>
<td>2.79</td>
<td>3.49</td>
<td>3.71</td>
<td>1.27</td>
<td>2.89</td>
</tr>
<tr>
<td>1995-96 to 2009-10</td>
<td>1.71</td>
<td>1.24</td>
<td>1.36</td>
<td>1.16</td>
<td>0.71</td>
<td>1.40</td>
</tr>
</tbody>
</table>

The above data of growth rates presents us an answer to the question how the growth rate of food grain production, including Rice, Wheat, Pulses and Cereals has varied during our study period between 1981-82 and 2009-10 in relation to total population growth rate during the same period\textsuperscript{11}. It shows that the overall food grain production growth rate (1.87 per cent) is slightly lesser than the overall population growth rate of 1.93 per cent. But if we observe the pre WTO and post WTO regime growth rates of food grains, they exhibit different picture. In the first sub period of pre WTO period, growth rate of food grain production (2.79 per cent) is significantly higher than the population growth rate of 2.10 per cent and on the other hand, the food grain growth rate in the second period of liberal WTO free trade, has drastically come down to 1.24 per cent which is very much lower than the growth of population during this period. It only suggests that, though the overall growth of food grain production is lagging behind the population growth rate during the total period and more so in the post liberal trade period of 1995-96 to 2009-10. It is a clear indication for the fact that our food grain production has not been able to grow so as to provide sufficient food grains to increasing population\textsuperscript{12}. This trend is more prominent during latest period of WTO free agricultural trades regime, as higher food grain production growth in the pre WTO period has seriously dropped down below the population growth during the WTO regime. That only


suggests that the food grain self sufficiency of India is more jeopardised during the WTO regime than in the pre WTO regime.

In the same way, the growth rate of Wheat, Rice, Pulses and Cereals has also been more positive in the pre WTO period as their respective growth figures 3.49, 3.71, 1.27 and 2.89 per cent in the first period have significantly come down to respective 1.16, 1.36, 0.71 and 1.40 per cent during the second sub period. It also again projects the same trends of insufficient production of Rice, wheat, Pulses and Cereals during the post WTO period of 1995-96 to 2009-10. This adverse growth, as far as food security of India is concerned, can be attributed to the restrictions that have been imposed on our farmers through WTO, in terms of opening up of the agricultural imports; reduction in import quotas, quantitative restrictions (QRs) imposing the strategy of export led growth and concentration on cash crops rather than the food grain crops. Also due to the gradual depletion of public investments over agriculture and also exposing our labour intensive and antiquate high cost cultivation to the developed agricultural markets have all together pushed Indian farmer into a fragile situation. Ultimately these trends have led to deterioration of the viability of cultivation and finally led to the drastic decline in the food grain production during this reform period and effected country’s food security at the aggregate level.

Firstly if we can observe the population during three periods, it’s very clear that growth rate in the first sub period, i.e. during pre WTO period is higher (2.10 per cent) is higher than the second sub period i.e. 1.71 per cent. And the overall growth of population is 1.93 per cent. On the other hand, the per capita availability (PCA) of food grains is far lesser than the growth rates of population in all the periods, especially in the total period it is just -0.04 per cent. It only emphasises the fact that hardly there has been any increase in the PCA of food grains. But this PCA of food grains is, to some extent, a positive in the first sub period of pre economic reforms with 0.35 per cent growth and in the second period it had declined to as low as -0.64 per cent negative growth rate. It only suggests that the per capita availability of food grains in India during our reference period has not grown on par with that of population growth. It can be due to various combinations of factors. Apart from a rapid increase in

---

14 Ibid
population, very placid and low production growth, especially during the post WTO period had severely affected the PCA of food grains. Because, under WTO regime a traditional Indian agriculture has been exposed to the developed country’s’ agriculture, during this period as there was rush of cheaper food grain imports, our high cost farming has not been able to withstand the competition from the affluent countries’ food grain imports. Hence they had shifted away from food grains or they had been compelled to shift away food grain cultivation as there was gradual decline in the support structure to the farming from the Government.

VII.2 Population & Per Capita Availability of Food grains Compounded Annual Growth rates: (From 1981-82 to 2009-10) (kg/year %)

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>F.Grains*</th>
<th>Rice</th>
<th>Wheat</th>
<th>Cereals</th>
<th>Pulses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-82 to 2009-10</td>
<td>1.93</td>
<td>-0.04</td>
<td>-0.14</td>
<td>0.49</td>
<td>-0.16</td>
<td>-0.65</td>
</tr>
<tr>
<td>1981-82 to 1994-95</td>
<td>2.10</td>
<td>0.35</td>
<td>1.04</td>
<td>1.40</td>
<td>0.58</td>
<td>-0.43</td>
</tr>
<tr>
<td>1995-96 to 2009-10</td>
<td>1.71</td>
<td>-0.64</td>
<td>-1.00</td>
<td>-0.78</td>
<td>-0.78</td>
<td>0.67</td>
</tr>
</tbody>
</table>

*Food grain production. Calculated by the researcher based on Raw data taken from ministry of Agriculture, economic survey of India and Ministry of Consumer Affairs, Food and Public Distribution, during Different referred time periods

In any economy, per capita availability of food grains is one of the important parameters that can be observed in order to assess the level food grain self sufficiency on the supply side at an aggregate level. In the case of Rice, Wheat, Pulses as well as Cereals in terms of compounded annual growth rates during all three periods. Only the Wheat has maintained positive growth rate (0.49 per cent), though lesser than the population growth rate of 1.93 per cent. But it had also put up as much as -0.78 per cent negative growth of PCA during the post WTO period, came down from the growth rate of 1.40 per cent during pre WTO period, between 1995-96 and 2009-10. Apart from Wheat, Rice PCA growth during the total referred period is -0.14 per cent, which is long way below the growth rate of population and also the growth rate of food grains. But it had a positive growth of (PCA of Rice) 1.04 per cent during the pre WTO period and later registered -1.00 per cent growth during the post WTO period with respect to PCA of Rice. In the same way same are the trends with PCA of Cereals (including coarse cereals) has had negative growth rate (-0.16 per cent) during overall period as well as second sub period (-0.78 per cent) despite maintaining positive growth of PCA with 0.58 per cent in the first sub period. But unlike Rice, Wheat and Cereals, Pulses PCA growth rate, despite its overall negative PCA growth of -0.65 per cent, has been positive in the second sub period of economic reforms with 0.67 per cent growth that was earlier negative at -0.43 per cent during the first sub period. This trend can be attributed to the
increase in area under cultivation for pulses as well as in crease in per hectare yield during the post liberalisation/ WTO period\textsuperscript{17}. Though this growth is not sufficiently enough for the economy, but it had somewhat stood up with competition unlike Rice and Wheat.

**Chapter VIII**

**Findings and Suggestions**

“Food security is as important as National Security and every food grain saved is food grain produced, India can’t prosper without agricultural prosperity”

**Conclusions and Suggestions:**

In India, chronic hunger rarely figures in public debates and electoral politics. In a recent count of these opinion articles over a period of 6 months, it was found that the health, nutrition, education, poverty, gender, human rights and related social issues combined accounted for barely 330 out of 300 articles. The neglect of social issues in general, and of chronic hunger in particular, is often attributed to lack of political will. \textit{Indian economy has one minor flaw, namely that most people are unable to participate in it due to economic insecurity, lack of education, social discrimination and other forms of disempowerment}. In short, Indian democracy is trapped in a vicious circle of exclusion and elitism. Because underprivileged sections of the population are excluded from active participation in democratic politics, their aspirations and priorities are not reflected in public policy. The elitist orientation of public policy perpetuates the deprivations like poverty, hunger, illiteracy, discrimination etc. that disempower people and prevent them from participating in democratic politics.

\textit{On the global front, we posses more cultivable land than China, but our yield is much lower than China, for eg: Per hectare yield of Rice in China is 8 tonnes where as in India it is just 3 tonnes}, which is due to low technology, low government investment and climatic conditions...etc. 56 per cent of our food grains come from the irrigated land and the remaining 44 per cent of food grains have to come from the unirrigated land. Therefore when the environment turns uneven, this 44 per cent of food grains production is at stake. Average area under operational holding is 2 hectares and the total farmers having this area are 86 per cent. If India is the largest producer of several crops, it is also the country that has \textbf{lowest}\textsuperscript{17}.

yield per hectare for all crops. The per hectare yield of rice in India (metric tonnes) is only 2.9, lagging behind many countries like Egypt 9.8, Japan 6.4, Korea 6.7, USA 7.8 and the world average is 3.9. Even we find lot of differences with in India among our states in terms of production and per hectare yield. This is the gap that has to be tapped to enhance the food grain production levels, especially in the light of global warming and depleting water resources, so that food security can be attained in future. Agriculture is included under GATT for the first time in 1994 and the entire policy regime is geared to make poor countries’ exports more primary products. Whether this process leaves more people in hunger or dead in these countries doesn’t appear to concern the advanced countries today anymore than it did in the past. It’s nothing but a decolonization.\textsuperscript{18}

We cannot depend on imports to maintain food security and mitigating the food inflation. According to some economists, inflation is nothing but a tax on the poor since food accounts for a relatively high proportion of their expenses which is bad news for ruling politicians, because it’s the poor India that vote in much larger numbers than the rich.\textsuperscript{19} If we remain as the food importer in the world market, international prices would increase sharply thus jeopardises our food security. In the second period, import growth rate of food grains has increased from -3.12 to 8.32 per cent; it only shows that the food grain imports have increased on a massive scale especially pulses, especially during second period involving liberal economic reforms and free trade that have affected our agriculture quite severely. Taking edible oils and pulses together, India has emerged during the 1990s as the world’s major importer of these commodities.

\textbf{8.8 Objectives Addressed}

Therefore, after our analysis, here we can say that, with regard to our first objective i.e. trends in food grain production and impact on food security, it is observed that in Indian context, during the study period under consideration the food grain production has fluctuated during pre and post WTO period. Therefore the food grain production growth was more positive in the pre reform period than in post reform period. The second objective, i.e. per capita availability also shows that the overall growth of per capita availability growth has been negative (excluding variations within the group of cereals and pulses) due to both decrease in


\textsuperscript{19} Paranjoy Guha Thakurta. “Is India, the World’s Second Most Populous Nation, Facing a Food Crisis” ? From (net) BBC – 2008-04-07, 06:53:40 GMT.
production and also due to other factors. These trends have led to the questions like emerging food insecurity in India.

Third objective, i.e. free trade environment and its effects on food insecurity, after our analysis throughout our research, we can observe that the both the growth of agriculture, exclusively the growth rate food grains and also the per capita availability of food grains have been positive and desirable during pre WTO period than in post WTO period. It only suggests that the WTO commitments of India have affected labour intensive Indian agriculture negatively, thereby food grain production and consequently our enlarged the scope for food insecurity. And finally our fourth objective, future demand and supply projections of food grains, based on reliable studies, it is clearly observed that by the year 2020 (and some studies by the year 2026) our food grain growth at aggregate level would be lagging behind the growth rate of income and also population. There will be a scope for probable and significant rift between projected demand and supply where in demand would be falling short of supply. These projections would only indicate us that unless we address the agricultural issues and increase the food grain production there would be every possible scope for India for landing up in a situation of insufficiency in food grains. If we do not have sufficient foreign exchange reserves to import food grains it would surely lead to a heavy prevalence of food security in India.

Bibliography

-----Barah B.C (Aug 2007) : “Criticality of Rice and Wheat System in Sustainable Food Security in India – An Analysis”. Agricultural Situation in India -.


-------Paranjoy Guha Thakurta. “Is India, the World’s Second Most Populous Nation, Facing a Food Crisis”? From (net) BBC – 2008-04-07, 06:53:40 GMT.


