

Project Completion Report

Food Price Inflation in India: Policy Imperatives

Implemented by

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Academy for Science, Policy Implementation and Research (ASPIRE)

ASPIRE was launched in 2010 by Department being incubated in project mode at the Administrative Staff College of India (ASCI), Hyderabad. It aims to provide a common platform for interconnecting and enhancing competencies in policy development and implementation emphasizing Science Technology and Innovation across various stakeholders and arms of the Government leading to evidence based decision making.

Some of the areas in which policy studies have been carried under ASPIRE include food price inflation, R&D in agriculture, pharmaceuticals, patents, steel related R&D and Innovation etc. Efforts are on to upscale the level of engagement of socio-economic ministries and public sector industries in ASPIRE for R&D management, Innovation and Policy including capacity building.

Table of Contents

<i>Executive Summary</i>	1
<i>1.0 Introduction</i>	5
<i>2.0 Food Inflation in India</i>	8
2.1 Initiatives of the Government	8
2.2 Domestic Forces that Drive Food Inflation in India: Food grain production, area under cultivation, yield, population, population below the poverty line, consumption of fertilizer and net sown area	9
2.3 Brief Analysis of the Key Food grain Production, Area under Cultivation and Yield since 1950-51 to 2010-11	10
2.4 People under the poverty line over the decades.	14
2.5 Consumption of Fertilizers and Availability of Irrigation	15
2.6 Population	18
2.3 Vegetables and Fruits	18
2.4 Climatic Zones in India and their impact on agriculture	20
<i>3.0 Factors for Stagnation in Agriculture in India: A Summary of the Literature</i>	23
<i>4.0 Policy Imperatives</i>	25
Food Management and Policy in India: A Historical Perspective	25
4.1 Policy Measures in Other Developing Countries for Containing Food Price Inflation	26
4.2 A Few Policy Measures and Alternatives for Long Term Solution to Food Price Inflation	27
<i>Bibliography</i>	31

List of Figures

FIGURE 1: ANNUAL FOOD PRICE INDICES (2002-04=100) OVER TIME.....	7
FIGURE 2: KEY FOOD GRAIN PRODUCTION IN INDIA FROM 1950-51 TO 2010-11 (IN MILLION TONNES)	11
FIGURE 3: TOTAL FOOD GRAINS PRODUCTION FROM 1950-51 TO 2010-11 (IN MILLION TONNES)	12
FIGURE 4: AREA UNDER FOOD GRAINS CULTIVATION FROM 1950-51 TO 2010-11 (IN MILLION HECTARES).....	13
FIGURE 5: AREA UNDER FOOD GRAINS CULTIVATION FROM 1950-51 TO 2010-11 (IN MILLION HECTARES).....	13
FIGURE 6: YIELD OF KEY FOOD GRAINS PER HECTARE FROM 1950-51 TO 2010-11 (IN KG/HECTARE).....	14
FIGURE 7: PEOPLE BELOW THE POVERTY LINE IN URBAN AND RURAL REGIONS OF INDIA AND THE CHANGING POVERTY LINE ..	15
FIGURE 8: BEHAVIOR OF THE PERCENTAGE OF PEOPLE BELOW THE POVERTY LINE.....	15
FIGURE 9: CONSUMPTION OF FERTILIZER IN INDIA FROM 1950-51 - 2008-09	17
FIGURE 10: GROSS AND NET SOWN AREA AND GROSS AND NET IRRIGATED AREA	17
FIGURE 11: DECENNIAL POPULATION OF INDIA	18
FIGURE 12: AREA UNDER VEGETABLE AND FRUIT PRODUCTION FROM 2000-01 TO 2008-09.....	19
FIGURE 13: PRODUCTION OF VEGETABLES AND FRUITS FROM 2000-01 TO 2008-09.....	19
FIGURE 14: REASONS OF FOOD PRICE INFLATION	24

Executive Summary

Food prices, globally, have shown considerable rise and volatility in the last five years. Two food crises (of 2008 and 2011) in the last three- four years has caused considerable pain and suffering around the world. The condition in India is no different¹ and food price inflation is causing serious concerns among policy makers. The policy prescriptions to contain this food price inflation would have to increase agricultural productivity, integrate the agricultural markets, undertake reform measures in storage, and reduce food wastage. The analysis of official statistics show that food grain production, area under cultivation and yield is going down monotonically, while population is rising exponentially. Also poverty is reducing significantly. The economic growth of the last two decades and the consequent urbanization in the country has also resulted in greater demand for food. While fertilizer consumption has gone up, the net sown area has not gone up by a large margin. Irrigations project are not many and groundwater resources are depleting. Also, wastage of food due to lack of storage and proper logistics is a big issue. Some estimates peg food wastage at as high as 30% for perishable food. All these forces and some international forces like rising global food prices, rising oil prices, and the depreciating dollar is responsible for this high food inflation in India. *The analysis of official statistics also shows that the growth rates of production of key food-grains in India have declined with each passing decade since the 50's. Average growth rate in food-grain production was highest in 1950s and has declined in each subsequent decade. It registered an improvement in the 90's but has reached its lowest level in the 2000's. In fact, the growth rate of wheat and rice production has reached below 1% in the 2000's.*

Food is organic and by its very nature perishable but some foods like vegetables, fruits, meat and poultry, and fish perish at a much higher rate than food grains. The recent food inflation owes a lot to the rise in food prices of perishable food like vegetables and fruits. The problem with perishable food is that the available space for cold storage in the country is only 20 million tonnes, while the production is about 180 million tones. *Even though FDI in cold storage has been allowed as policy for more than 15 years now, not a single facility has been created in this mode of investment.* Since cold storage and efficient logistics are

¹ India is now in a inflationary phase from December 2009. Inflation peaked in India in April 2010 (at about 11%, which is much lesser than the historical peak of September 1974 when inflation was about 33%) and has since been difficult to control. One of the main causes of this overall double digit inflation in India is the high food inflation.

extremely important for longevity of such perishable foods and to ensure that the fresh produce reach the consumers in time, it is vital that more policy measures be taken to improve the state of affairs of these two factors. However, this requires very large investments and careful and long term planning. Promoting the use of fertilizer and using groundwater for irrigation were the most important policy measures² apart from the policy of using high yielding varieties of food grains since the 1960's. It is estimated that about 50 to 60 percent of the increase in food grain production the country since the days of food shortage in 1960s can be attributed to higher fertilizer and groundwater use. However, since 1991, almost all governments have been stressing on the need for reforms in fertilizer policies as the huge amount of subsidy given is causing serious troubles for fiscal consolidation and management. Food Corporation of India (FCI) and the Agricultural Prices Commission (APC) are important bodies that help the government to have monopoly control. Today the government sets a procurement price, at which it purchases grains from farmers, and a ration price which is lower than the retail price of the grain, at which it sells rationed quantities of grains as entitlements to food to households through Fair Price Shops (FPS). This mix of procurement, storage and distribution, and selling policy worked well for the last several decades and ensured that the interests of the farmers are protected and at the same time the citizens get a fair price for food.

Hence we find that the food price inflation is a symptom of the interplay of the following major forces:

1. Growth in demand
2. Stagnation in supply due to low productivity and growth
3. Huge wastage esp. in perishable foods
4. Low growth in cultivation area
5. Lack of innovation and adoption of best practices
6. Lack of irrigation facility and availability of cheap fertilizers
7. Lack of connection with farm and market
8. Global events

Now, the government has very little handle on the forces 1 and 8. It can however, take policy measures that increase supply by increasing

² However, subsidizing fertilizer and electricity for groundwater based irrigation has had its share of criticisms too. There is now increasing realization in the government that the manner, in which fertilizer is produced, distributed and sold needs reform. Also, indiscriminate use of groundwater has led to lowering of groundwater table and has created a shortage of drinking water in some regions.

- a. Productivity
- b. Area under cultivation
- c. Ensuring irrigation and availability of fertilizers at affordable costs
- d. Eliminating wastage
- e. Improving logistics to link farm and market
- f. Rewarding and encouraging innovation and technological intervention in agriculture

Of these 6 measures as listed above, some can be taken up on priority which will enable the government to have a better bang for the buck. Three policy measures can help the government achieve this. They are:

- i. Policy for Decentralized Food Reserves
 - a. Food grain Banks
 - b. Emergency Stocks/Buffer Stocks

In this measure the government can create a block level or district level grain bank to ensure that food that is grown in excess in certain years is stored in grain banks to be used later. This will also create a hedge against volatility. This grain bank may have some features of traditional money banks and strict regulatory regime is required to manage its operations properly. This will also reduce the cost of the government in procuring and distributing the grains as everything will be done locally instead of the centralized mechanism that exists today.

- ii. Policy for Arid and Semi Arid Climatic Regions
 - a. Drip Irrigation
 - b. Implementing Best Practices of Countries

These measures are already being implemented in certain states like Gujarat and Madhya Pradesh with remarkable results. This increases the area under cultivation, ensures better irrigation and also improves productivity.

- iii. Policy on Increasing Investments in Agriculture
 - a. Improving (Cold)Storage
 - b. Improving Information Management
 - c. Improving Logistics

- d. Improving Training
- e. Implementing Best Practices in Farming Techniques like SRI, farm bunding etc.
- f. Increase Mechanization
- g. Improving and Encouraging the Farming of (Genetically) Improved Varieties

This is a package of reforms that the government can take in conjunction with other initiatives that it already has like MGNREGA.

iv. Policy of Enhancing Innovations in Agriculture

- a. Technological Innovations
- b. Non Technological Innovation

A comprehensive policy on innovation in agriculture is required.

The above set of 4 policy measures can be taken up by the government in quick time and will ensure a very fast improvement on the ground. In conjunction to these measure, the government can then take up long term reform measures in fertilizer, power for irrigation, PPP in agriculture, bio fuel policy and other initiatives.

1.0 Introduction

Food prices, globally, have shown considerable rise and volatility (OECD, 2011; Huchet-Bourdon, 2011; Martini, 2011) in the last five years. In fact, in February 2011, the global food prices registered a new high after rising by more than 30%, year on year (Asian Development Bank, 2011). Two food crises (of 2008 and 2011) in the last three- four years has caused considerable pain and suffering around the world. Several countries are reporting high double digit food inflation and there is considerable debate and discussion in informed circles on the measures to contain it.

The international prices of maize and wheat have almost doubled between June 2010 and mid-March 2011 but unlike in the last crisis the price of rice have been stable (Fan, Torero, & Headey, 2011). The impact of this high global food price is being felt by billions of people across the planet, more in poor countries. All major international multilateral organizations are debating on measures (Food and Agriculture Organization of the United Nations, 2011) to contain this problem and ensure that food is available to everyone at affordable price levels.

The present rise is triggered by shortfalls in production and consequent reduction in inventories of major food producing countries. The global food crisis has resulted in average domestic food inflation in January 2011, of about 10% in Asia, which has affected about 3.3 billion people³. Unlike the global food crisis of 2007-08, this time in 2011, food inflation is high in India and China (10 percent in China and 18 percent in India between December 2009 and December 2010⁴), which is home to more than one third of human population.

High food price is not just an economic issue but an issue that concerns large number of people in poor countries and hence can easily turn into a destabilizing force that can topple governments and lead to chaos and anarchy. Several organizations and governments have come together to work out a solution to this issue and some early signs of stability in prices is already visible. Production shortfalls, vagaries of weather, structural and cyclical factors, and high growth in developing countries are often pointed out as

³ This according to some estimates could push an additional of more than 64 million people into poverty.

⁴ Mostly driven by higher prices of meat, fish, eggs, dairy, vegetables, and fruits.

some of the reasons for this rise in food prices. Other reasons for food inflation are expanding bio-fuel production⁵ ⁶, rising oil prices, US dollar depreciation⁷, export restrictions, weather events and panic purchases.

The condition in India is also no different⁸ and food inflation is causing serious concerns among policy makers. However, it must be pointed out here that the situation in India is somewhat better than in other parts of Asia⁹.

If the recent trend of spikes in food prices at regular intervals continues in this country, then long terms solutions through appropriate policy prescriptions are needed to tackle this problem (Martini, 2011; Food and Agriculture Organization of the United Nations, 2011). These policy prescriptions would have to increase agricultural productivity, integrate the agricultural markets, ensure that the poor are cushioned from these price shocks, influence eating habits, undertake reform measures in storage, and reduce food wastage.

Figure 1, given below is a plot of the global food price indices for the last 21 years. It shows the two spikes in prices in 2007-08 and now in 2011. In fact, almost all the indices have more than doubled in the last five years.

⁵ According to Organization for Economic Co-operation and Development (OECD), global bio-fuel production is likely to more than double between 2006–08 and 2018. A detailed analysis is available at OECD-FAO. (2010). OECD-FAO Agricultural Outlook 2009–2018. Paris and Rome.

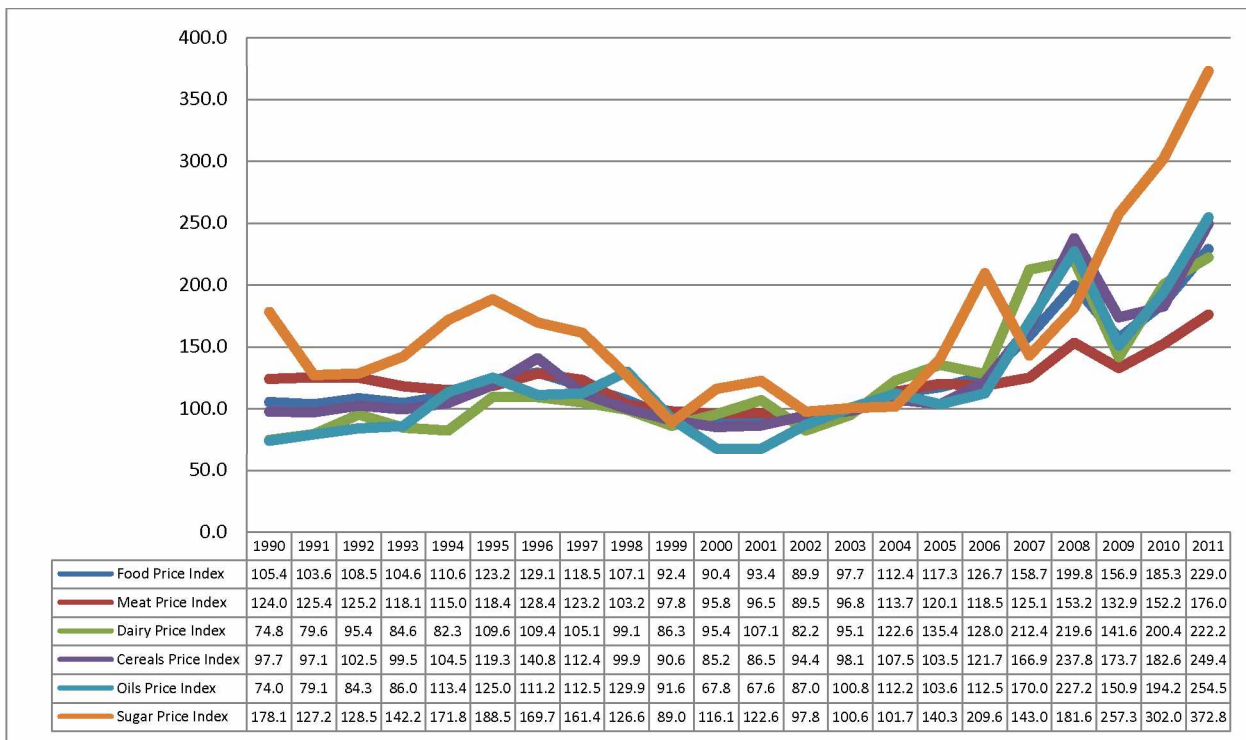
⁶ Experts also claim that ethanol demand in United States is a major factor in increasing maize prices, which is creating a domino effect on livestock prices as well. The United States Energy Independence and Security Act of December 2007 mandate that bio-fuels use be increased to 36 billion gallons by 2022. For more details see Headey. D. (2011). "Rethinking the Global Food Crisis: The Role of Trade Stocks,". *Food Policy*. 36(2).

⁷ Most grains are traded in US dollars

⁸ India is now in an inflationary phase from December 2009. Inflation peaked in India in April 2010 (at about 11%, which is much lesser than the historical peak of September 1974 when inflation was about 33%) and has since been difficult to control. One of the main causes of this overall double digit inflation in India is the high food inflation.

⁹ India has experienced stability in prices from mid nineties till 2006 and some ascribe this to this recent phase of high inflation.

Figure 1: Annual Food Price Indices (2002-04=100) over time



Source: Food and Agriculture Organization of the United Nations,
Data downloaded from <http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/>

Notes:

Food Price Index: Consists of the average of 5 commodity group price indices mentioned above weighted with the average export shares of each of the groups for 2002-2004: in total 55 commodity quotations considered by FAO commodity specialists as representing the international prices of the food commodities noted are included in the overall index.

Meat Price Index: Computed from average prices of four types of meat, weighted by world average export trade shares for 2002-2004. Quotations include two poultry products, three bovine meat products, three pig meat products, and one ovine meat product. Where more than one quotation exists for a given meat type, they are weighted by assumed fixed trade shares. Prices for the two most recent months may be estimates and subject to revision.

Dairy Price Index: Consists of butter, SMP, WMP, cheese, casein price quotations; the average is weighted by world average export trade shares for 2002-2004.

Cereals Price Index: This index is compiled using the grains and rice price indices weighted by their average trade share for 2002-2004. The Grains Price Index consists of International Grains Council (IGC) wheat price index, itself average of 9 different wheat price quotations, and 1 maize export quotation; after expressing the maize price into its index form and converting the base of the IGC index to 2002-2004. The Rice Price Index consists of 3 components containing average prices of 16 rice quotations: the components are Indica, Japonica and Aromatic rice varieties and the weights for combining the three components are assumed (fixed) trade shares of the three varieties.

Oil and Fat Price Index: Consists of an average of 12 different oils (including animal and fish oils) weighted with average export trade shares of each oil product for 2002-2004.

Sugar Price Index: Index form of the International Sugar Agreement prices with 2002-2004 as base.

2.0 Food Inflation in India

Food inflation is a phenomenon that hurts the poorer sections more and hence in a developing country like India, it results in despair amongst a large section of society and a lot of anger on the streets. It is also a topic that is actively researched in India by many scholars (Basu, 2011; Kumar, Vashisht, & Kalita, 2010). Also, food articles have a high share in the overall basket of goods that constitute the index on which inflation is measured. It has a combined weight of about 14.3 percent¹⁰ in the revised Wholesale Price Index (WPI) for India. Food itself retains a high 45 percent weight overall in the combined rural-urban Consumer Price Index. Clearly, food articles¹¹ are a major group in any index and any rise in prices in this group also reflects in higher overall inflation of the country, triggering responses from the Reserve Bank of India.

2.1 Initiatives of the Government

The issue of food inflation is now being given very serious attention at the highest level in the government. An Inter-Ministerial Group (IMG) on inflation was constituted on 2nd February, 2011, and this group has had four meetings of the full Group¹². Also, the Prime Minister's Office (PMO) is concerned about this problem. A meeting of Secretaries¹³ (taken by the Principal Secretary to the Prime Minister) of all science and technology departments was held on 14th November 2011 to discuss the issues related to

¹⁰ The weight of wheat in WPI is 1.12 percent, rice is 1.79 percent, oilseeds is 1.78 percent, and milk is 3.24 percent.

¹¹ These articles include mainly cereals, milk, rice, wheat and vegetables. Of these items wheat prices are rising rapidly in global markets (Food Price Watch, February 2011).

¹² A brief report from the Chair of IMG based on the first two meetings of the IMG especially on matters pertaining to Agricultural Produce Market Committees (APMC) Act has already been sent to the Cabinet Secretary on 05.04.2011.

¹³ The following Secretaries attended the meeting:

- Secretary, Department of Agriculture and Cooperation
- Secretary, Department of Animal Husbandry, Dairying and Fisheries
- Secretary, Department of Agricultural Research and Education
- Secretary, Department of Science and Technology
- Secretary, Department of Biotechnology
- Director General, Council for Scientific and Industrial Research.

research and development in agriculture sector with the objective to sustain food security and contain food inflation. Several suggestions and initiatives were discussed in this meeting.

On the basis of research carried out at the behest of the IMG and under the supervision of the Chairman of IMG, two important issues have been highlighted. One relates to the issue of high margin between farm gate prices and retail price¹⁴ and the other relates to the creation of enabling competitive environment at the local level to stop cartelization by reforming the Agricultural Produce Market Committees (APMC) Act.

Multi-Product Retail (MPR) Reform, is one initiative that the government is actively considering. This entails Foreign Direct Investment in MPR. This initiative is likely to reduce the margin between the farm gate price and the retail price. However, this initiative is politically risky and may not materialize in the near future.

The second initiative that the government is working on is to bring reforms in the APMC Act that will enable the farmers to directly sell their produce to retail outlets, which will reduce the role of middlemen in the entire agricultural commodity trade and will thereby bring down prices for the consumers and also at the same time increase the value that the farmer gets for his produce. APMC Act in its present form does not enable this to happen. In fact, some experts opine that the APMC Act, even though created to safeguard the interests of the farmers, has ended up creating monopolistic and cartel like trading environments that help the middlemen only.

2.2 Domestic Forces that Drive Food Inflation in India: Food grain production, area under cultivation, yield, population, population below the poverty line, consumption of fertilizer and net sown area

¹⁴ The gap between the price that the farmer gets for his produce and the price that the consumer pays in the retail outlets to procure those articles has been historically very high in India. This means that the middlemen who control the supply of agricultural produce to the consumers are the real beneficiaries of the rise in retail prices and not the farmers. Some policy measures are needed in this area to curb the clout of the middlemen so that the farmer and the consumer both get a fair price.

A brief analysis of the forces that affects food inflation is presented in this section. The analysis of official statistics show that food grain production, area under cultivation and yield is going down monotonically, while population is rising exponentially. Also poverty is reducing significantly. This coupled with the fact that the economic growth of the last two decades has resulted in greater consumption and demand for food. While fertilizer consumption has gone up, the net sown area has not gone up by a large margin. All these forces and some international forces like rising global food prices, rising oil prices, and the depreciating dollar is responsible for this high food inflation in India.

Water resources are also scarce. Irrigations project are not many and groundwater resources are depleting. Global events also affect prices. Food price in recent years have been closely related to international oil prices and with the exchange rate of the US dollar. Also, wastage of food due to lack of storage and proper logistics is a big issue. Some estimates peg food wastage at as high as 30% for perishable food. Our eating habits also are such that we depend more on wheat and rice and less on coarse cereals, which can be grown in plentiful quantities in the semi arid and arid regions of the country and which are also rich in nutrients and fiber. This also needs to change slowly.

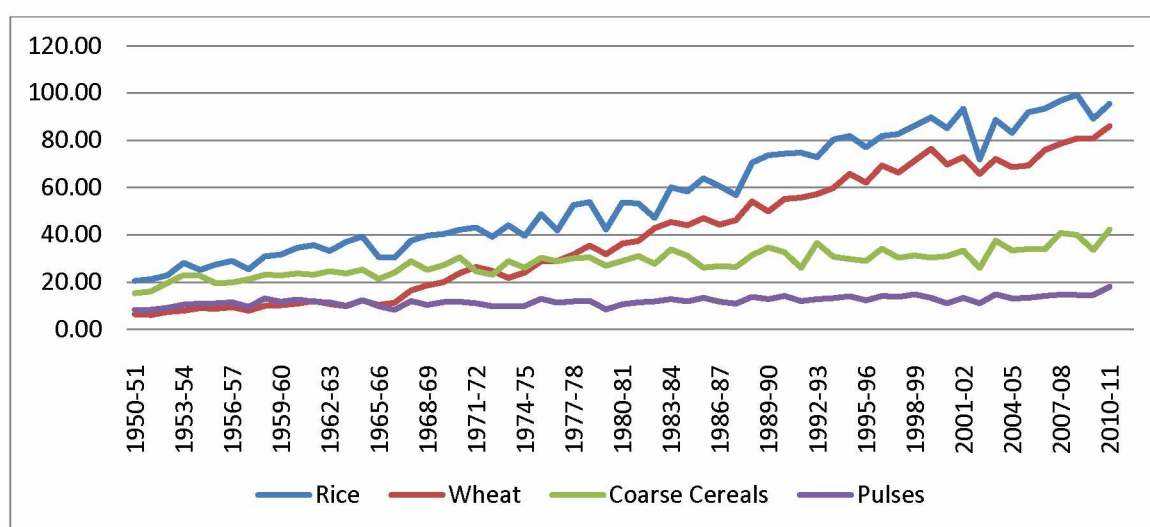
2.3 Brief Analysis of the Key Food grain Production, Area under Cultivation and Yield since 1950-51 to 2010-11

The growth rates of production of key food-grains in India have declined with each passing decade since the 50's. Average growth rate in food-grain production was highest in 1950s and has declined in each subsequent decade. It registered an improvement in the 90's but has reached its lowest level in the 2000's. In fact, the growth rate of wheat and rice production has reached below 1% in the 2000's.

A simple analysis of the food-grain production in India from 1950-51 to 2010-11 shows that rice and wheat production have been steadily increasing (showing an upward trend) over the years and have been broadly mirroring each other, but the coarse cereal and pulses production in the same period have stagnated.

However, the rate of growth in food-grain production is not encouraging and has been declining. In fact, for pulses there has been only a very small increase in production the last 60 years. The figure 2, shows the behavior of production of the four key grains in the last 60 years. Apart from the production, the average yield and the area under cultivation has stagnated as well. This coupled with global food crisis of 2007-08 has resulted in volatility in prices and some urgent policy measures are required to improve the condition of agriculture in the country.

Figure 2: Key Food grain Production in India from 1950-51 to 2010-11 (in Million Tonnes)

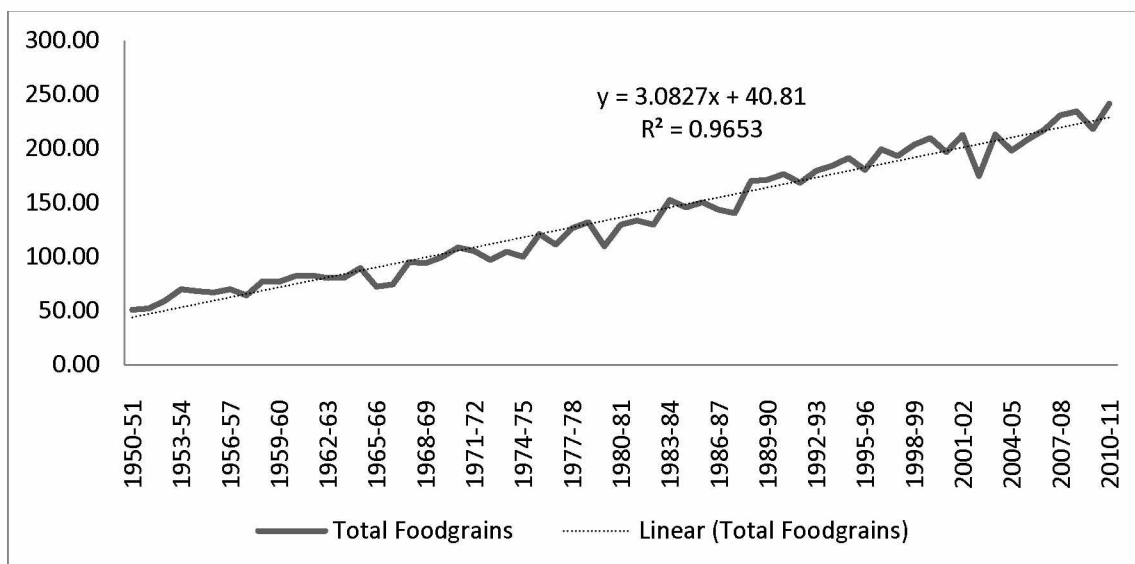


Source: Data downloaded from Reserve Bank of India Website <http://www.rbi.org.in>

Note: Data for 2010-11 are based on Advance Estimates

Figure 3, shows the behavior of the total food-gains production in the last 60 years and it is evident that there is an upward trend and production has more than quadrupled in 60 years but the rate of growth has not kept pace with the rate of increase of population.

Figure 3: Total Food grains Production from 1950-51 to 2010-11 (in Million Tonnes)

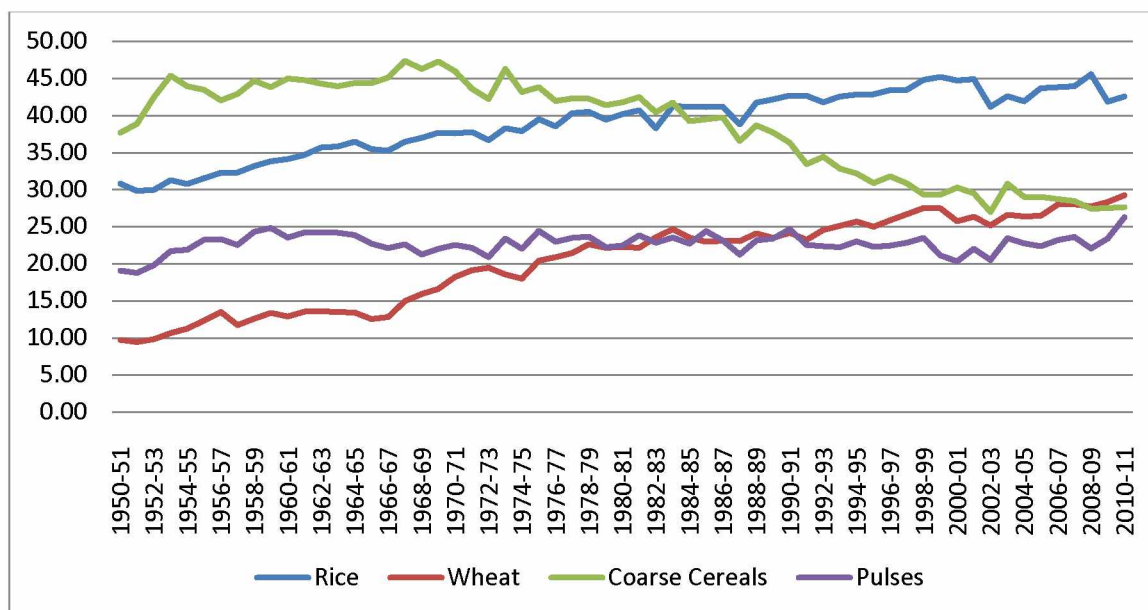


Source: Data downloaded from Reserve Bank of India Website <http://www.rbi.org.in>

Note: Data for 2010-11 are based on Advance Estimates

Figure 4, shows the area under cultivation for the four major food grains in the last 60 years. As is evident from the figure, the area under cultivation for coarse cereals has been steadily declining since the 70's till date. Area under pulses production has not changed much but for both wheat and rice the areas under cultivation has increased. However, for rice there is some stagnation in the last few years.

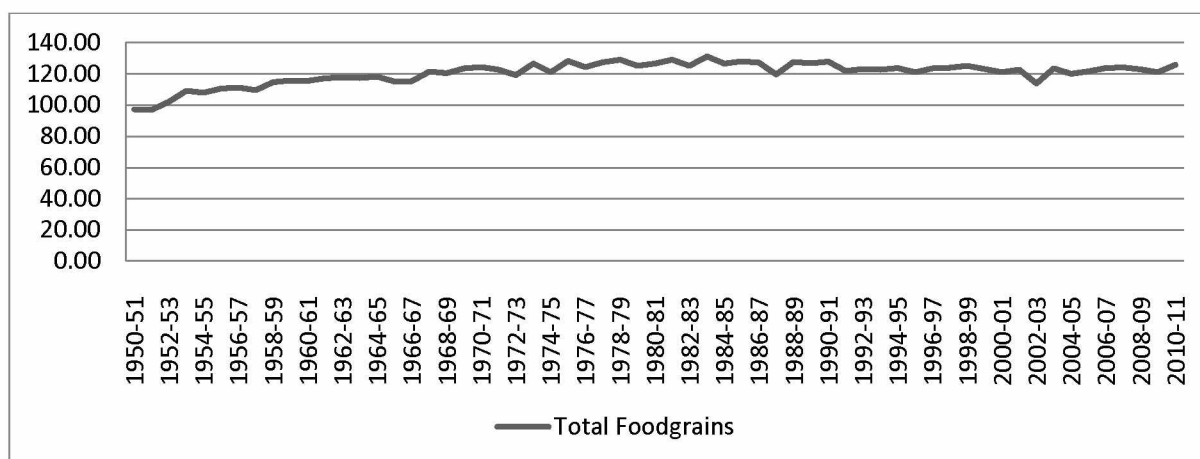
Figure 4: Area under Food grains Cultivation from 1950-51 to 2010-11 (in Million Hectares)



Source: Data downloaded from Reserve Bank of India Website <http://www.rbi.org.in>
 Note: Data for 2010-11 are based on Advance Estimates

Figure 5, shows the behavior of the total area under food grains cultivation in the last 60 years. Clearly, the graph shows three features. It is evident that in 50's and 60's the area under food gains cultivation increased rapidly and then stagnated in the late 70's. In the 80's and 90's there is a decline and again stagnation in 2000's. This shows that more effort is required in bringing in more area under food gains cultivation.

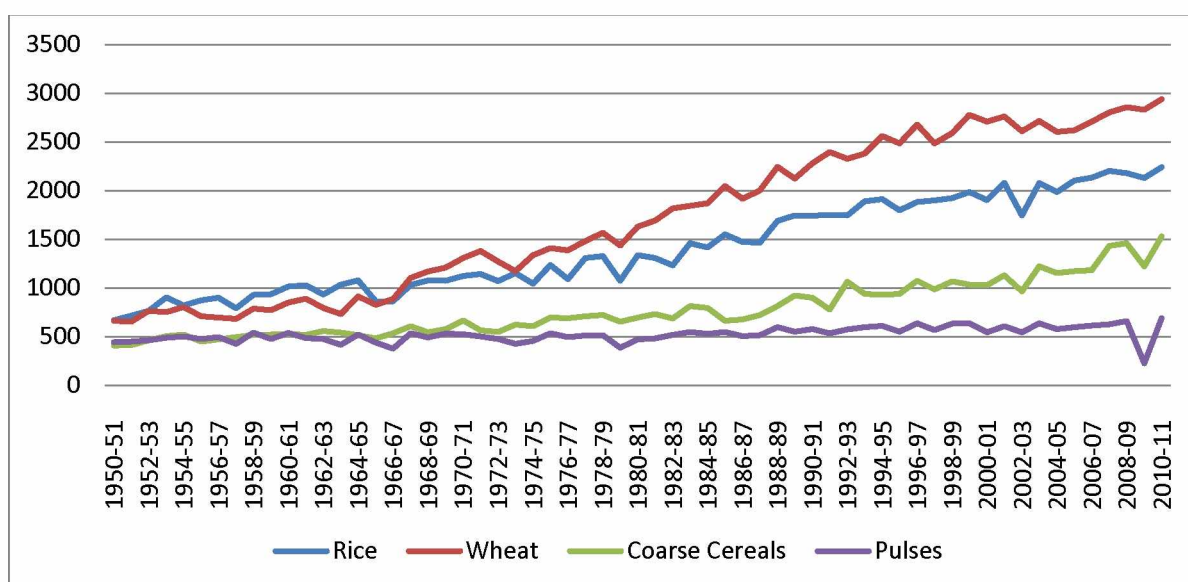
Figure 5: Area under Food grains Cultivation from 1950-51 to 2010-11 (in Million Hectares)



Source: Data downloaded from Reserve Bank of India Website <http://www.rbi.org.in>
 Note: Data for 2010-11 are based on Advance Estimates

The yield of food grain in the last 60 years is shown in figure 6. It is evident that the yield of wheat and rice is increasing, whereas for coarse cereals and pulses, it is stagnating. Also, wheat outperforms rice by a good margin. However, the growth in yield is not very impressive signifying scope for greater technological intervention.

Figure 6: Yield of Key Food grains per Hectare from 1950-51 to 2010-11 (in Kg/Hectare)

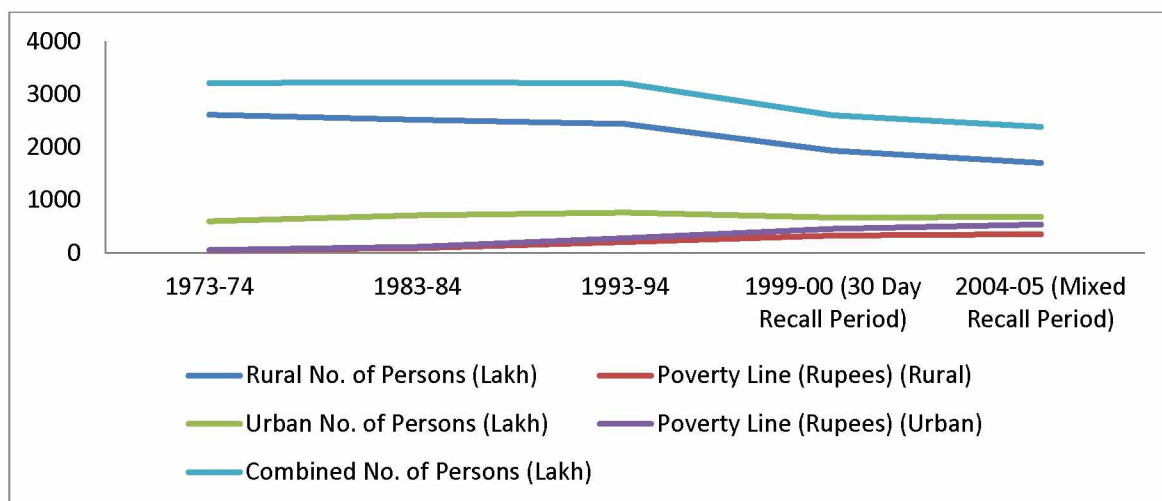


Source: Data downloaded from Reserve Bank of India Website <http://www.rbi.org.in>
 Note: Data for 2010-11 are based on Advance Estimates

2.4 People under the poverty line over the decades.

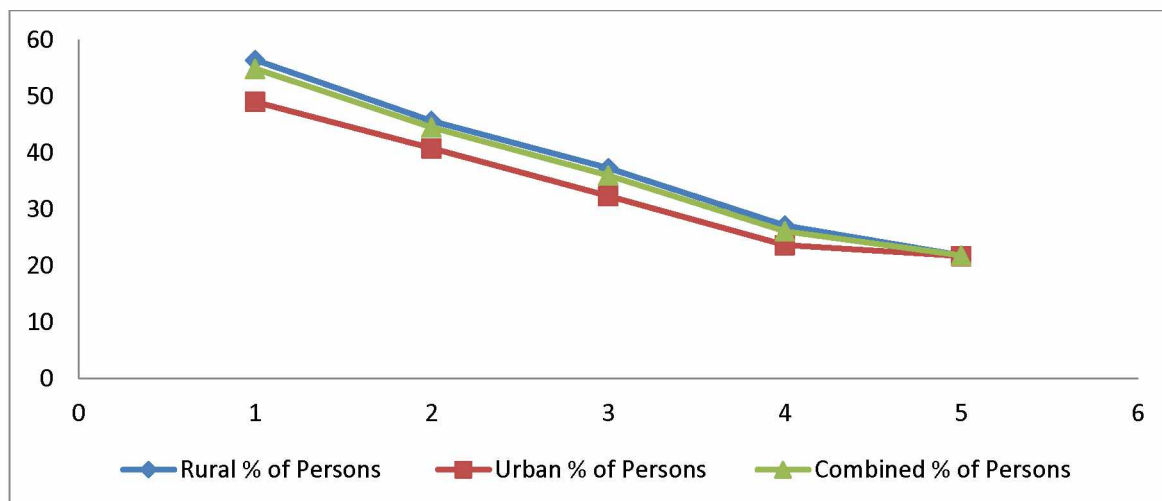
Figures 7 and 8, show that the number and percentage of people below the poverty line is decreasing continuously. Also, the poverty line itself has been redefined from time to time. This shows that the number of poor people in this country is going down in each decade in both absolute terms and percentages.

Figure 7: People below the Poverty line in Urban and Rural Regions of India and the Changing Poverty line



Source: Planning Commission

Figure 8: Behavior of the Percentage of People Below the Poverty line



Source: Planning Commission

2.5 Consumption of Fertilizers and Availability of Irrigation

In the 1960s when India was a net importer of food, food shortages and foreign-exchange shortages happened regularly. Also, United States, then our main food exporter adopted a policy of using food

exports as an instrument of foreign policy. Consequently, the government of India adopted a set of policies¹⁵ that are together responsible for our self sufficiency in food.

Promoting the use of fertilizer and using groundwater for irrigation was one of the most important of those policies¹⁶ apart from the policy of using high yielding varieties of food grains. It is estimated that about 50 to 60 percent of the increase in food grain production the country since the days of food shortage in 1960s can be attributed to higher fertilizer use¹⁷.

Also groundwater is used in about 55 to 60 percent of India's irrigated lands¹⁸. Figure 9, shows that the consumption of fertilizer in India has been growing exponentially. However, since 1991, almost all governments have been stressing on the need for reforms in fertilizer policies¹⁹ as the huge amount of subsidy given is causing serious troubles for fiscal consolidation and management.

¹⁵ Subramaniam, C. (1995). *Hand of destiny*, vol. 2: *The Green Revolution*. Bombay: Bharatiya Vidya Bhavan.

¹⁶ However, subsidizing fertilizer and electricity for groundwater based irrigation has had its share of criticisms too. There is now increasing realization in the government that the manner, in which fertilizer is produced, distributed and sold needs reform. Also, indiscriminate use of groundwater has led to lowering of groundwater table and has created a shortage of drinking water in some regions. (Perrin & Ahmed)

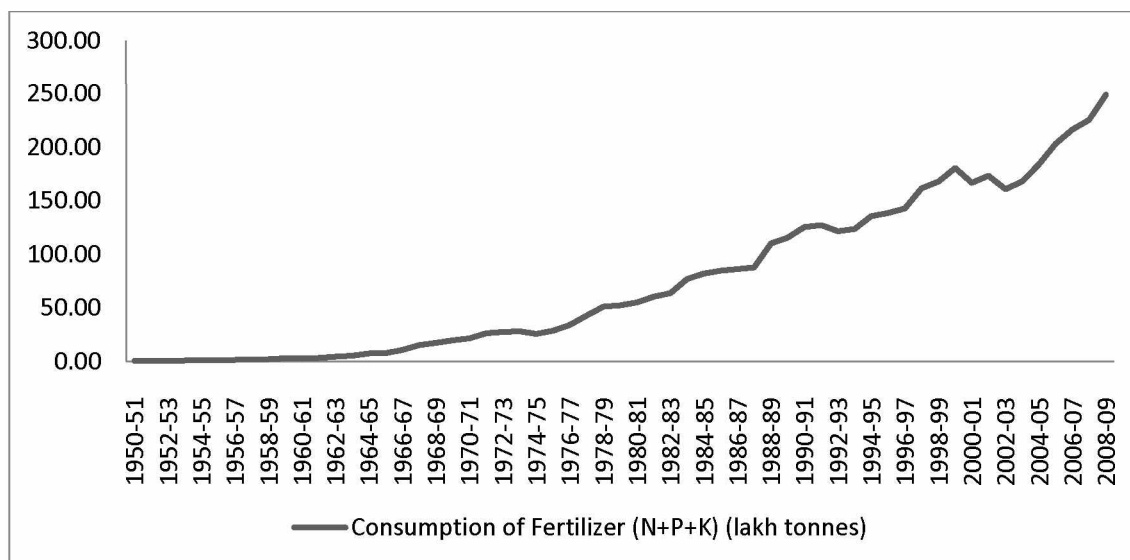
¹⁷ Venugopal, P. (2004). *Input management*, vol. 8: *State of the Indian farmer: A millennium study*. Academic Foundation for the Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India. New Delhi.

¹⁸ Shah, T., C. Scott, A. Kishore, and A. Sharma. (2003). *Energy-irrigation nexus in South Asia: Improving groundwater conservation and power sector viability*. Research Report 70. International Water Management Institute. Colombo, Ceylon.

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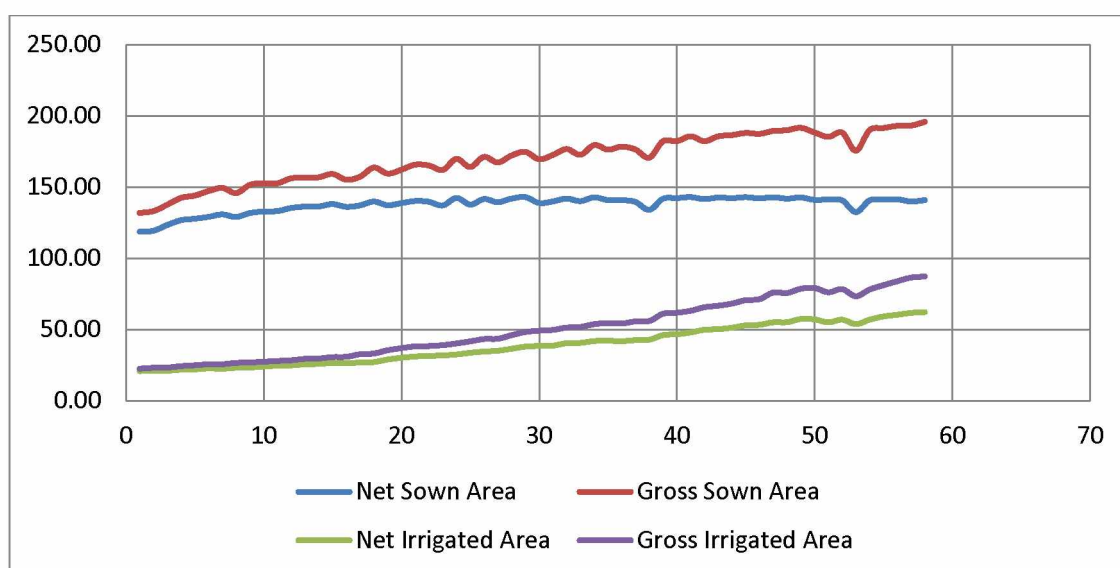
Figure 9: Consumption of Fertilizer in India from 1950-51 - 2008-09



Source: Data downloaded from Reserve Bank of India Website <http://www.rbi.org.in>

Figure 10, shows the Gross and Net Sown Area and Gross and Net Irrigated Area for the past 60 years (since 1950-51). As is evident, the rate of growth of gross and net sown area or gross and net irrigated area has not been good. In fact, a lot more effort is required to improve these indicators and some good policy measures are required to bring more area under irrigation (Birner, Gupta, & Sharma, 2011).

Figure 10: Gross and Net Sown Area and Gross and Net Irrigated Area

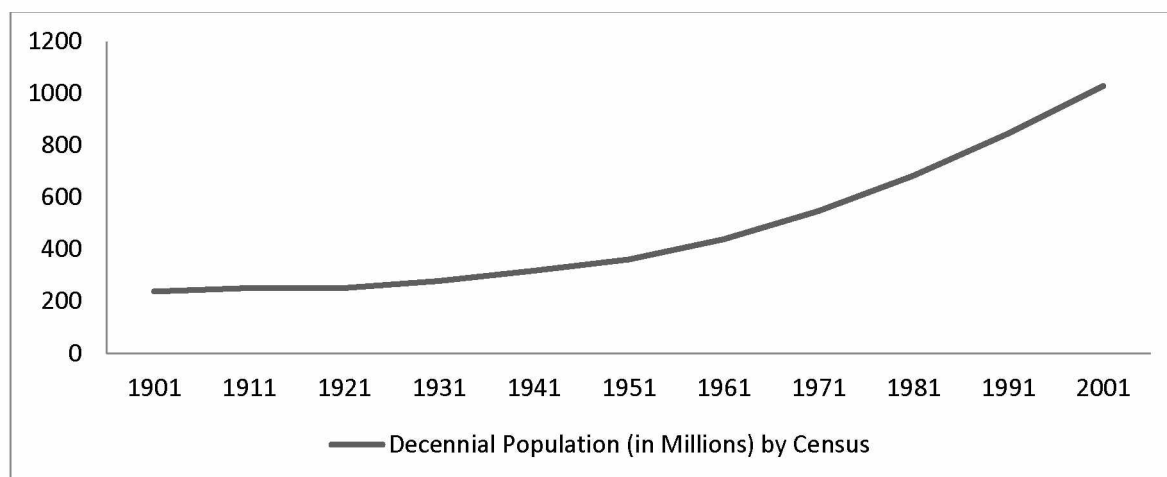


Source: RBI

2.6 Population

The official statistics on population as captured in each Census since 1901 is plotted in figure 11. Clearly, the population of the country is growing at an exponential rate with a median population age of 25.5.

Figure 11: Decennial Population of India



Source: Office of the Registrar General of India, Ministry of Home Affairs

2.3 Vegetables and Fruits

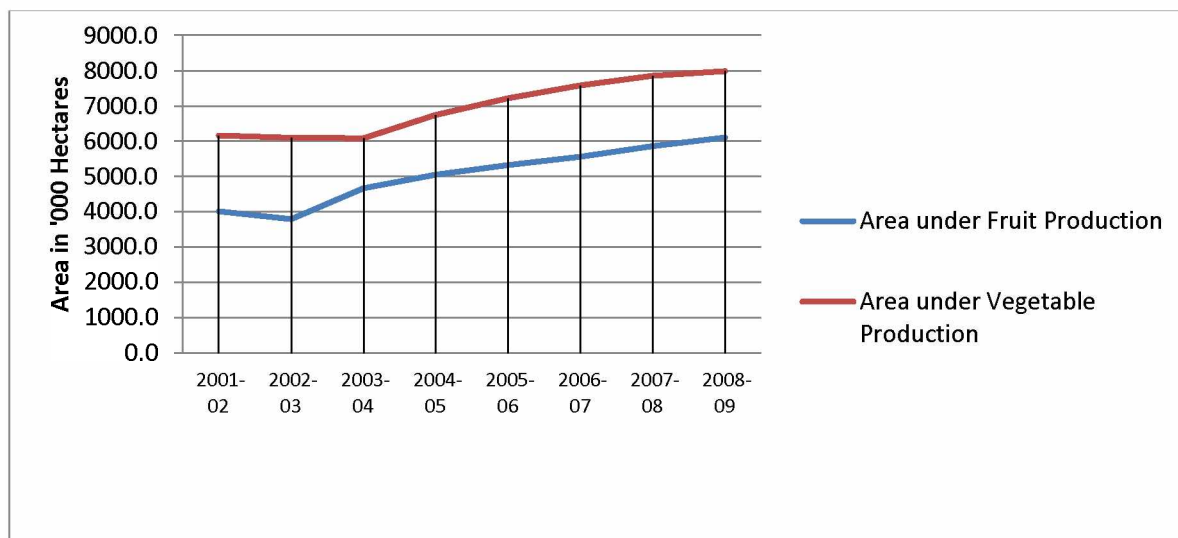
Food is organic and by its very nature perishable but some foods like vegetables, fruits, meat and poultry, and fish perish at a much higher rate than food grains. The recent food inflation owes a lot to the rise in food prices of perishable food like vegetables and fruits. The problem with perishable food is that the available space for cold storage in the country is only 20 million tonnes, while the production is about 180 million tones.

Even though FDI in cold storage has been allowed as policy for more than 15 years now, not a single facility has been created in this mode of investment. Since cold storage and efficient logistics are extremely important for longevity of such perishable foods and to ensure that the fresh produce reach the consumers in time, it is vital that more policy measures be taken to improve the state of affairs of these two factors. However, this requires very large investments and careful and long term planning.

Figure 12 and 13, show the area and production respectively of vegetable and fruit production and from 2000-01 to 2008-09. Clearly, there is an increase in the area of production and also the production.

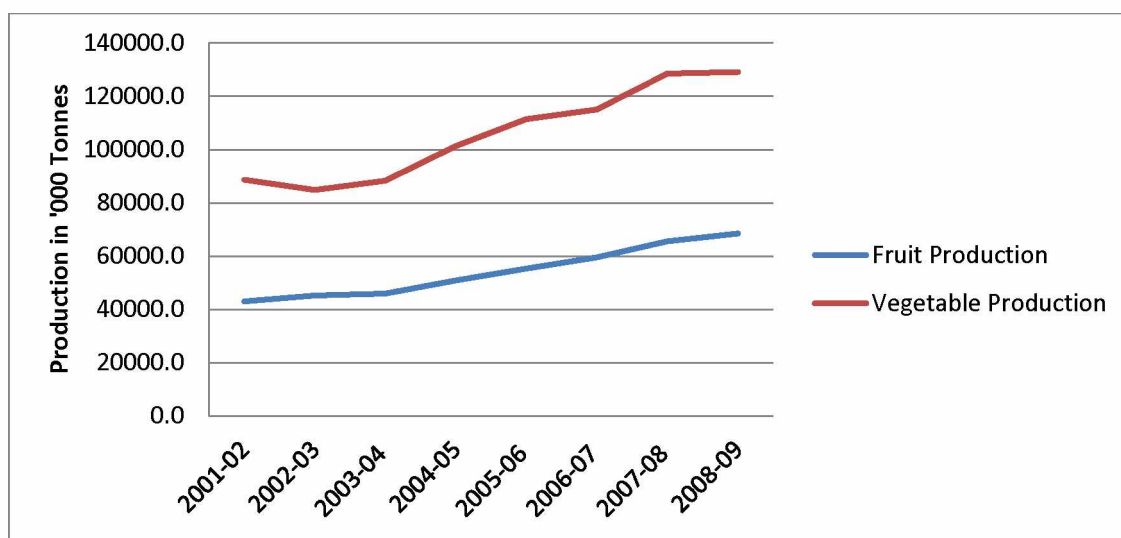
However, these are not enough to offset the high demand due to rise in population, reduction in poverty and better GDP growth.

Figure 12: Area under Vegetable and Fruit Production from 2000-01 to 2008-09



Source: Ministry of Statistics and Programme Implementation, Data downloaded from http://mospi.nic.in/Mospi_New/site/India_Statistics.aspx?status=1&menu_id=14

Figure 13: Production of Vegetables and Fruits from 2000-01 to 2008-09



Source: Ministry of Statistics and Programme Implementation, Data downloaded from http://mospi.nic.in/Mospi_New/site/India_Statistics.aspx?status=1&menu_id=14

2.4 Climatic Zones in India and their impact on agriculture

The agricultural sector is responsible for about 13%-33% of global Green House Gas emissions, but only for about 4% of global output. The following climatic zones are present in India based on the Köppen

Climate Classification

1. Montane
2. Humid Subtropical
3. Tropical Wet and Dry
4. Tropical Wet
5. Semi Arid
6. Arid

(Source: www.wikipedia.com)

As parts of the country fall under the Arid and Semi Arid zones, not all kinds of food items can be produced in these areas. These areas also represent the areas that are fallow. Coarse cereals that can be produced in these regions do not have a good demand.

However, this also presents an opportunity. A slew of policy measures can transform agriculture in these climatic zones as is evident from the success of such initiatives in Gujarat. Gujarat has benefitted from building irrigation facilities like small canals etc. and also by implementing the drip irrigation method for agriculture. A careful mating of the soil type with the crop type and its genetic variety can also improve productivity of such regions.

Water Resources

As the figures in the tables given below, show there is serious need for a water policy for agriculture. Some measures like water credit on similar lines as carbon credit or some best practices like farm bunding can help in both increasing agriculture productivity as well as improve water conservation.

Water Resources (in Billion Cubic Metres)	
Total rainfall	4000
Total Water Availability	1869
Total Utilizable Water	
Surface water	690
Ground water	432
Total	1122

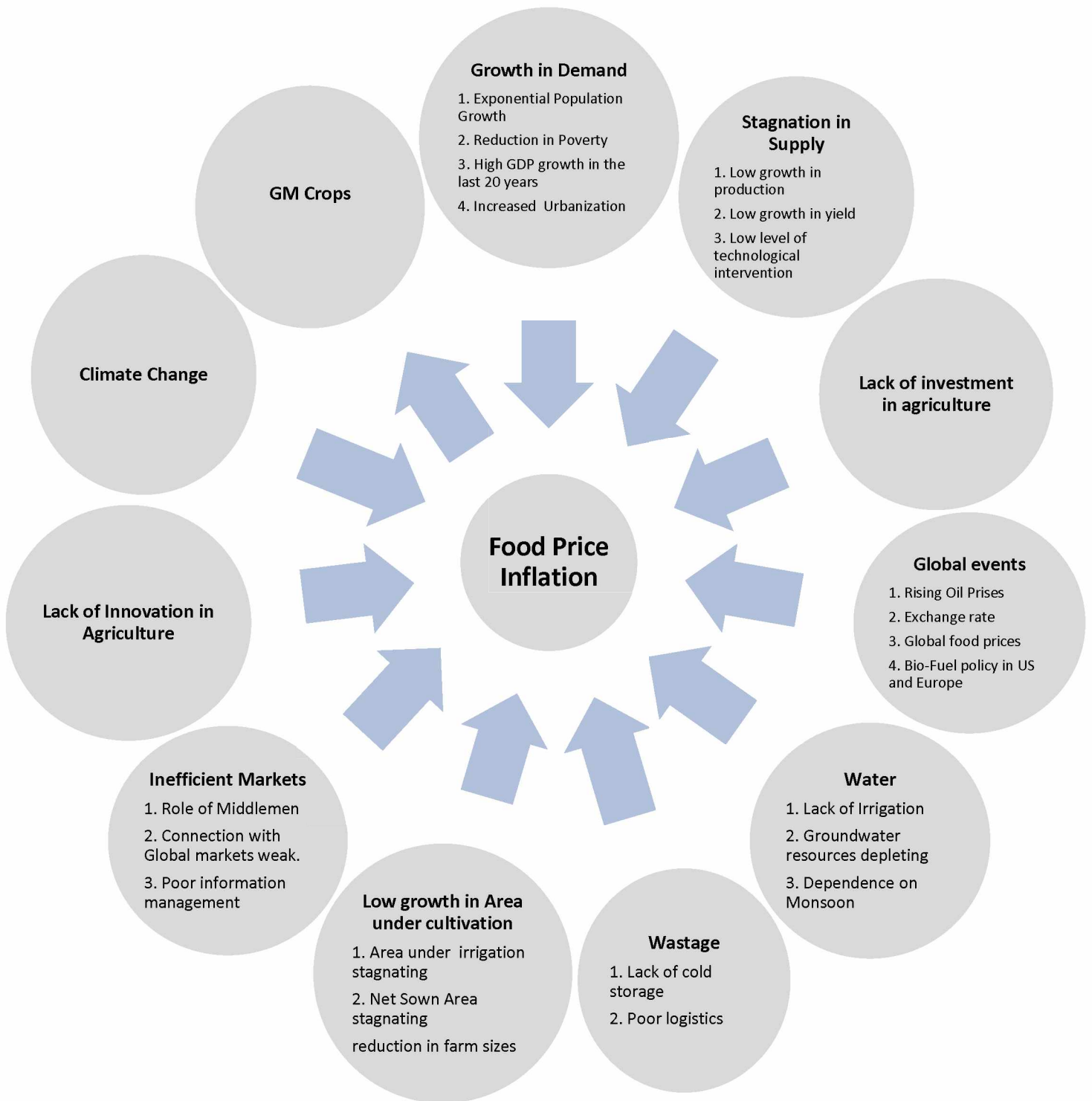
Irrigation Development (in Million Hectares)	
Ultimate Irrigation Potential	139.89
Potential created upto March,2002	93.95
Major & medium Projects	37.05
Minor Irrigation	
- Surface water	12.00
- Ground water	44.90

Per Capita Water Availability in Cubic Metres per year	
1951	5177
1991	2209
2001	1820
2025	1341
2050	1140

3.0 Factors for Stagnation in Agriculture in India: A Summary of the Literature

A brief scan of the relevant literature on food price inflation shows that a series of factors are responsible for the rise in food prices. Fundamentally, we can say that the demand for food is growing, supply is stagnating, and investments in agriculture are not taking place leading to lower productivity and wastage. Also, global events that affect food prices adversely are happening regularly, area under cultivation is stagnating, water for irrigation is scarce and all this coupled with inefficient agriculture markets has created a situation that is creating this food price inflation. The price rise is steeper (and seasonal in nature) in the perishable food category.

Figure 14: Reasons of Food Price Inflation



4.0 Policy Imperatives

In this section we elaborate the policy measures that are being taken by other developing countries and the measures that India must embrace to ward off food price inflation in future.

Food Management and Policy in India: A Historical Perspective

Price control in agriculture has been a policy feature in India since the days of World War II when a series of price control conferences were held in the colonial British administrators in response to rising prices of foodgrains and the subsequent Bengal Famine of 1943. However, the roots of today's dual pricing policy in India can be traced to the 1960's, when India was a net importer of food. Food shortages and foreign-exchange shortages happened regularly. Also, United States, then our main food exporter started using food exports as an instrument of foreign policy. Consequently, the government of India adopted a set of policies²⁰ that are together responsible for our self sufficiency in food.

Promoting the use of fertilizer and using groundwater for irrigation was one of the most important of those polices²¹ apart from the policy of using high yielding varieties of food grains. It is estimated that about 50 to 60 percent of the increase in food grain production the country since the days of food shortage in 1960s can be attributed to higher fertilizer use²².

It also led to the creation of Food Corporation of India (FCI) and the Agricultural Prices Commission (APC). The government subsequently expanded the scope of FCI to include monopoly control over imports, mandatory levies on rice, and preferential credit and transportation access²³.

²⁰ Subramaniam, C. (1995). *Hand of destiny*, vol. 2: *The Green Revolution*. Bombay: Bharatiya Vidya Bhavan.

²¹ However, subsidizing fertilizer and electricity for groundwater based irrigation has had its share of criticisms too. There is now increasing realization in the government that the manner, in which fertilizer is produced, distributed and sold needs reform. Also, indiscriminate use of groundwater has led to lowering of groundwater table and has created a shortage of drinking water in some regions. (Perrin & Ahmed)

²² Venugopal, P. (2004). *Input management*, vol. 8: *State of the Indian farmer: A millennium study*. Academic Foundation for the Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India. New Delhi.

²³ However, as envisaged, FCI operations have become

- expensive
- controlled by special interests,
- too much emphasis on rice and wheat.

Today the government sets a procurement price, at which it purchases grains from farmers, and a ration price which is lower than the retail price of the grain, at which it sells rationed quantities of grains as entitlements to food to households through Fair Price Shops (FPS). This mix of procurement, storage and distribution, and selling policy worked well for the last several decades and ensured that the interests of the farmers are protected and at the same time the citizens get a fair price for food.

However, the government has liberalized the food gains policy partially. In 1994-95 the government of Prime Minister Narsimha Rao decided to open up rice export and within a year, rice export jumped from less than one million tonnes to about five million tons. This was followed by the liberalization of wheat exports in 1995. Wheat exports also zoomed but also increased domestic price of wheat and a nervous government banned wheat export. However, as figure 1 shows, the global food prices dropped dramatically by more than 30% between 1998-99 and it was more lucrative to sell cereals to the government at the minimum support price (MSP) than to export.

This policy needs further reform.

4.1 Policy Measures in Other Developing Countries for Containing Food Price Inflation

Let us now turn our attention to the policy measures that are being taken up by similar countries in Asia to counter and contain food price inflation. Table 1 lists the various policy measures that have been adopted by some developing countries including India to contain food inflation. Some of the measures are short term policies that may not have a long term impact and have been taken by the respective countries to only tackle the recent surge in food price inflation.

Table 1: Policy Measures adopted in other countries in Asia

	Policy Measure	Countries that have adopted this policy
1	Reduce Taxes	Azerbaijan, Pakistan, Turkmenistan, Mongolia, Bangladesh, Sri Lanka, Indonesia, Lao People's Democratic Republic
2	Increase Supply	Afghanistan, Kyrgyz Republic, Pakistan, Tajikistan, People's Republic of China, Bangladesh, India, Nepal, Sri Lanka, Cambodia, Lao People's Democratic Republic, Thailand
3	Restrict Export	Pakistan, Turkmenistan, People's Republic of China, Bangladesh, India
4	Control Prices/ Subsidize Consumers	Azerbaijan, Kazakhstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan, People's Republic of China, Bangladesh, Indian, Nepal, Sri Lanka, Leo People's Democratic Republic, Philippines, Thailand, Vietnam
5	Cash Transfers	Kazakhstan, Kyrgyz Republic, People's Republic of China,
6	Food for Work	Armenia, Georgia, Bangladesh
7	Food Aid	Afghanistan, Georgia, Pakistan, Uzbekistan, Mongolia, Bangladesh, India, Indonesia, Philippines,
8	Feeding Programs	Uzbekistan, People's Republic of China, India
9	Stimulate Production	Afghanistan, Armenia, Georgia, Turkmenistan, Uzbekistan, People's Republic of China, Mongolia, Bangladesh, India, Cambodia, Indonesia, Lao People's Democratic Republic, Thailand, Vietnam

4.2 A Few Policy Measures and Alternatives for Long Term Solution to Food Price Inflation

The following set of policy measures is worth debating in informed circles to evolve a set of policies for long term solution to food price inflation.

1. Policy for Decentralized Food Reserves
 - a. Food grain Banks

b. Emergency Stocks/Buffer Stocks

In this measure the government can create a block level or district level grain bank to ensure that food that is grown in excess in certain years is stored in grain banks to be used later. This will also create a hedge against the volatility. This grain bank may have some features of traditional money banks and strict regulatory regime is required to manage its operations properly.

2. Policy on reducing the costs for procuring, distributing, and buffer stocking

Food grains

3. Policy of National Safety Net for Food Security

4. Policy for Arid and Semi Arid Climatic Regions

a. Drip Irrigation

b. Implementing Best Practices of Countries in such Regions like Israel

5. Policy on Increasing Investments in Agriculture

a. Cold Storage

b. Improving Information Management

c. Improving Logistics

d. Improving Training

e. Implementing Best Practices in Farming Techniques like SRI, farm bunding etc.

f. Increase Mechanization

g. Improving and Encouraging the Farming of (Genetically) Improved Varieties

6. Policy of Enhancing Innovations in Agriculture

a. Technological Innovations

b. Non Technological Innovations

7. Policy of Huge Push in Technological Intervention in Agriculture

a. Pre Harvest Technologies

b. Post Harvest Technologies

8. Policy of Smart Use of Fertilizer

a. Increasing Fertilizer Production

b. Improving Training of Farmers

9. Policy on Improving Market Information, Transparency, and Government Response Mechanism and Structure.
10. Policy of Reducing Barriers to Agriculture (Inter-State) Trade
11. Policy of Waste Reduction
12. Policy of Land Use – Bio-Fuels, Cash Crops, Food Crops, Industry, Habitation, Forests etc.
13. Improving International Cooperation and Collaboration
14. PPP in agriculture
15. Linking MGNREGA with agriculture productivity improvement measures
16. Captive agro farming in other countries

A separate policy option paper is being developed. It will have policy prioritization algorithm and comparative analysis of the various policy measures.

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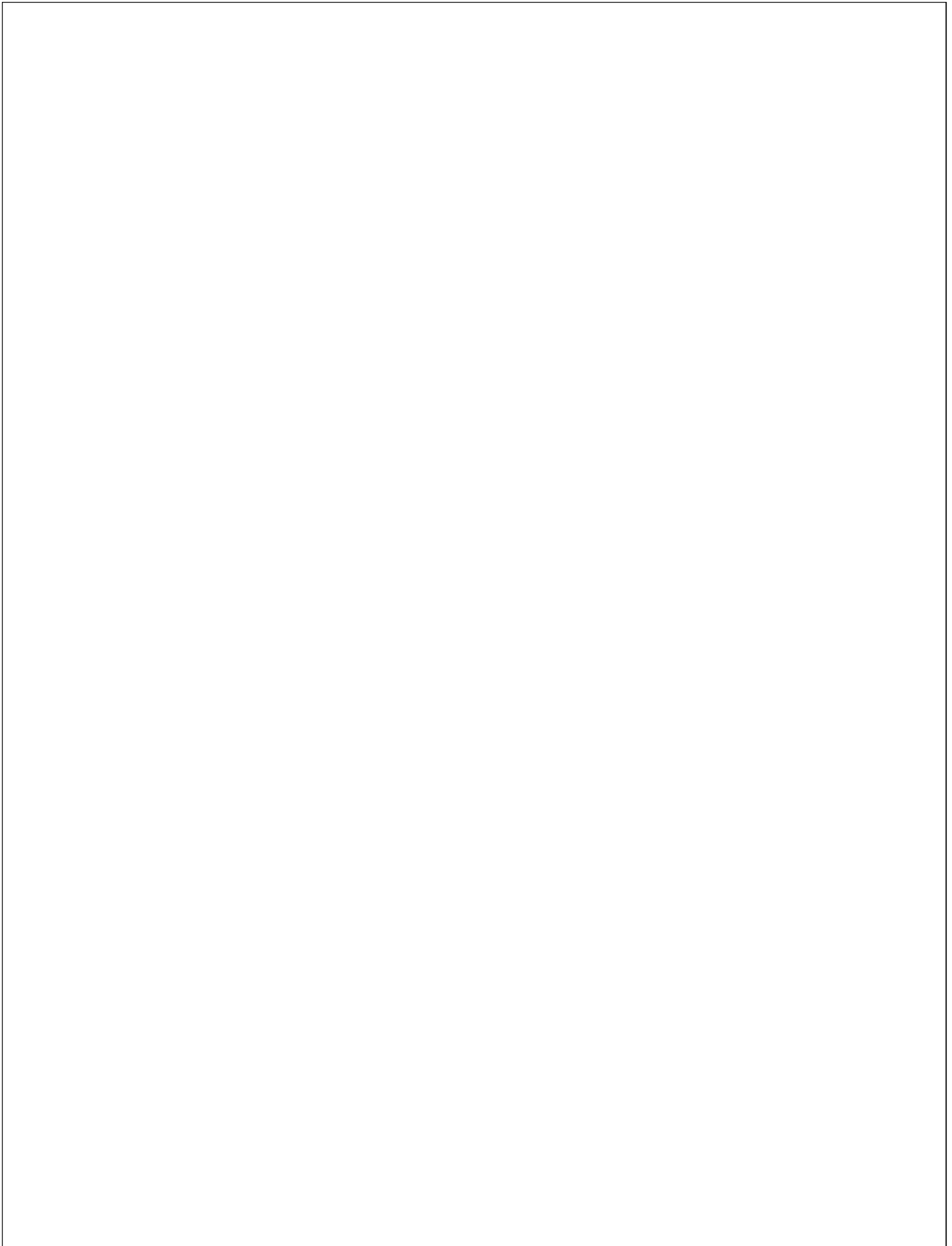
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