

## India, Agriculture-Concerns, Opportunities and Challenges

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### ABSTRACT

Agriculture is the heart of rural economy for India. This sector provides gainful employment as well as raw materials for a large number of industries in the country. Off. late, and economic reforms the trade liberalization, considerable changes have been noticed in this sector.

Indian planners and policy makers do realize how critically important it is to have more than 4% growth in agriculture to give any meaning to 'inclusive growth'. It is also recognized that major investments would be needed both by public and private sectors to achieve this end. Investments, institutions and incentives will be critical for bringing in and scaling up innovations in the agricultural sector. Technology has played an important role in improving productivity. Agriculture production can only be increased by reducing prevailing knowledge deficit of latest agricultural technologies with the farmers. Knowledge deficit can be improved by strengthening human resource- capacity building and rapid transfer of the farm technology.

### I. INTRODUCTION

Despite concerted industrialization in the last six decades, agriculture still occupies a place of pride. It provides employment to around 60 per cent of the total work force in the country. Dr. Swami Nathan, an eminent agriculture scientist and chairman National Commission on Farmers observed that agriculture is a gainful industry but it is something related to their self respect. Due to changing circumstances the plight of Indian agriculture is in a deplorable condition. It is a fact that the main objectives of agriculture sector have not been achieved since the inception of five year plan till today. The effectiveness of Indian agriculture is the effectiveness of Indian economy. India has the highest farm area under cultivation, but the yield is neither under cultivation, but the yield is neither encouraging nor remunerative to the cultivators. In China net cropped area is only ten percent while the world average is 10.7% in India around 45% of the total area is under cultivation. Unfortunately, the investment agriculture has gradually decreasing compared with the first five year plan to explain. The plan lay has also reduced from 15.14%, 4.9% and 11.42% to 6.45% respectively likewise average growth rate of food production has also not encouraging.

#### Reasons for Decline in Production :

The agricultural credit scenario has been good over the last 3 plans but the average GDP growth rate for agriculture seems to be declining as under:

#### Agriculture Growth Rate :

|                           |      |
|---------------------------|------|
| Ninth Plan (1997-2002)    | 2.50 |
| Tenth Plan (2002-2007)    | 2.47 |
| Eleventh Plan (2007-2012) | 2.20 |
| Twelfth Plan (2012-2017)  | 1.6  |

Decline in the public investment in agriculture sector- trends in public investment in agriculture and allied sectors reveal that it has consistently declined in real terms.

Table-1 : Share of Gross Public Private Investment in Agriculture

| Year    | Share of Percent |         |
|---------|------------------|---------|
|         | Public           | Private |
| 1999-00 | 17.8             | 82.2    |
| 2000-01 | 18.4             | 81.6    |
| 2000-02 | 18.2             | 81.8    |
| 2000-03 | 17.1             | 82.9    |
| 2003-04 | 26.8             | 73.2    |
| 2004-05 | 29.2             | 70.8    |

|         |      |      |
|---------|------|------|
| 2008-09 | 18.0 | 82.0 |
|---------|------|------|

Sources: Economic Survey, 2010-11 : Ministry of Agriculture 2008 and 2010

This table indicates the presence of a huge gap in the share of gross public and private investment in agriculture during 1999-00 and 2008-09.

From the sixth plan to the Ninth Plan (Sixth Plan [1980-85] Rs. 64,012 crore, Seventh Plan [1985-90] - Rs. 52,108 crore, Eighth Plan [1992-97] - Rs. 45,565 crore and Ninth plan [1997-2002] - Rs. 42,226 crore). But this trend was reversed in the Tenth Plan (2002-07) and public investment in agriculture registered an increase of Rs. 25,034 crore.

**Imbalanced use of fertilizers:** Chemical fertilizers have played a significant role in the development of the agricultural sector. The consumption of Nitrogenous (N) Phosphatic (P) and Potash (K) Fertilizers are rise.

**Table 2: Consumption of Major Fertilizers**

| Category     | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 |
|--------------|---------|---------|---------|---------|---------|---------|
| <b>N</b>     | 16820.9 | 16750.1 | 16949.6 | 17372.3 | 16735.9 | 16959.3 |
| <b>P</b>     | 6653.4  | 5633.5  | 6098.9  | 6978.8  | 6705.5  | 6854.4  |
| <b>K</b>     | 2061.8  | 2098.9  | 2532.9  | 2401.5  | 2508.5  | 2779.7  |
| <b>Total</b> | 25536.2 | 24482.4 | 25581.3 | 26752.6 | 25949.9 | 26593.4 |

Source: [faidelhi.org](http://faidelhi.org)

However, improving the marginal productivity of soil still remains challenge. The excessive use of fertilizers and pesticides their accumulation and leaching leading to nutritional imbalances, micro nutritional deficiencies, soil aeration etc.

**Declining land to man ratio and size of farm holdings :** With the continued rise in population the arable land to man ratio has decreased from 0.5 ha (1951) to 0.14 ha at present and is expected to decline further to 0.08 ha by year 2020. The small sized and scattered nature of the holdings will adversely affect the farm efficiency and will result in high cost of production. This in turn will result in low productivity and thus reduced agricultural sustain ability and food security.

**Decreasing total factor productivity :**

The total factor productivity (TFP) is used as an important measure to evaluate the performance of a production system and sustainability of its growth pattern. Reasons for decreasing the total factor productivity are :

- **High nutrient turn over in soil :** Plant system coupled with low and imbalanced fertilizer use.
- Emerging deficiencies of micro and secondary nutrients (s, zn, B, Fe, Mn etc.)
- **Soil degradation** due to acidification, aluminum toxicity, soil salinization and alkalization, soil erosion.
- **Wide nutrient** gap between nutrient demand and supply.
- Consequent deterioration in soil physical, biological and chemical quality and low fertilizer use efficiency.

**The First Green Revolution :**

First green revolution started in the sixties which built up its tempo with the aggressive role played by various input agencies like seed, fertilizer and pesticide production, drastically improved techniques & their transfer from lab to land.

First green revolution was a spectacular success in India & became a role model for many developing nations to follow. The concept made by hybridization of seed and chemicalization made agriculture the norm. The green revolution favored the rich land lords owing agri-infrastructure. The mono culture of high yielding varieties led to diversion of more land under these varieties resulting in imbalance in production pattern as far as other important crop like oilseeds, coarse grains & pulses were concerned, affecting adversely the house-hold nutritional security. Higher costs of production due to costly inputs. The rich farmer could afford the required input and reaping most of the benefits of green revolution. However, inadequate investment in infrastructure development and poor infra-institutional co-ordination gave negative results of green revolution to the small farmers.

The analysis of growth in food grains production during 1960-61, 1990-91 and 2009-10 indicated that the food grain production at a higher rate during 1990-91 as against 2009-10 for almost all crops under reference.

**Table No.3: Percent Growth of Crops**

| S.No. | Crop                    | 1960-61 | 1990-91 | 2009-10 | Percent Growth |              |
|-------|-------------------------|---------|---------|---------|----------------|--------------|
|       |                         |         |         |         | 1990-91 Over   | 2009-10 Over |
|       |                         |         |         |         | 1960-61        | 1990-91      |
| 1.    | Rice                    | 35.0    | 75.0    | 89.0    | 114.3          | 18.7         |
| 2.    | Wheat                   | 11.0    | 55.0    | 808.8   | 298.2          | 46.9         |
| 3.    | Coarse Cereals          | 23.0    | 32.0    | 33.6    | 39.13          | 5.0          |
| 4.    | Total Cereals (1+2+3)   | 69.0    | 162.0   | 203.4   | 134.8          | 25.5         |
| 5.    | Pulses                  | 13.0    | 14.0    | 14.7    | 7.7            | 5.0          |
| 6.    | Total Food Grains (4+5) | 82.0    | 176.0   | 218.1   | 114.6          | 23.9         |

Sources: Ministry of Agriculture, 2010 and Economics Survey, 2010-11

### Need for Second Green Revolution :

The first green revolution has become outdated and scientists are of the opinion that there is a need of a second green revolution as food security is the major challenge before the country. The second green revolution will depend solely. On the extensive and intensive use of integrated nutrient pest and water management revival of indigenous specific seed and planning material, age old tried farming technology and the use of biotechnology tools to meet effectively the future challenges to improve agri production.

Now it is time to launch a "**Gene Revolution**" instead of "**Green Revolution**" to feel the world and make Indian farmer rich. Many scientists believe that new plants developed using modern Bio-Technology will play an important role in increasing our ability to produce enough food. Advancement of Bio-technology is having dramatic impacts on Global agricultural production.

Bio-tech crops were planted on over 100 million hectares in 2006 by 10 million farmers in 22 countries and the results have been found well in all countries where farmers have access to bio-tech crops yields are higher and production costs are lower, making farmers have access to bio-tech crops, yields are higher and production costs are lower, making farmers more efficient than ever before. Since 2007, when bio-tech cotton was introduced India's cotton output has almost doubled to 27 million bales weighing 170 kilograms each and average yields are up around two-thirds, largely, because of lower rates of pest infestation. Unlike the original "**Green Revolution**" which saw large increase in use of pesticides and fuel, the new bio-tech crops of "**Gene Revolution**" Help Reduce the use of Inputs like pesticides, fuel and water. Agriculture is a contribution of greenhouse gas and studies have shown that biotech crops help decrease this emission. Scientists estimates the biotech crop planted in 2005 decreased global emission of carbon dioxide by 20 billion pounds.

### Agricultural Development Policies and Programmes

#### Canal Irrigation Project

Assured irrigation system is essential for the generation output, employment and income and capital formation in agriculture.

This project was initiated in 1991. The main objective of this project was to increase irrigated land.

#### MP Local Area Development Fund (1991):

This programme was initiated for development work in area represented by MP. The scheme did not make any tangible development with several flows in its execution.

#### National Agriculture Technology Project (1998):

The National Agricultural Technology Project (NATP) is a dynamic instrument of introducing major changes in the Agricultural Research and Extension system of the country, besides developing their capabilities to meet future challenges. The project was initiated by Ministry of Agriculture, Gov. of India with the financial assistance of World Bank.

#### Agricultural Technology Management Agency (ATMA):

ATMA is a society of Key take Holders involved in agricultural activities for sustainable agricultural development in the district. It is a focal point for integrating research and extension activities and decentralizing day to day management of the public agricultural Technology system (ATS) It is a registered society responsible for technology dissemination at the district level.

#### National Horticulture Mission (2005):

To promote holistic growth of the horticulture sector through area based regionally differentiated strategies the National Horticulture, during the Xth plan with effect from 2005-06.

**Rastriva Krishi Vikas Yoiana (2007) (RKVY):**

To provide benefit the farmers community "The Ministry of Agriculture has launched the Rastriya Krishi Vikas Yojna (RKVY) during the financial year 2007-08 to encourage the state to invest more towards agriculture and allied sectors so as achieved 4% annual growth. This would help in increasing the production and productivity. The scheme has and out lay Rs. 25000 for the plan period to provide central assistance to the state.

**National food security mission (2007):**

Understanding the importance of food security the National Development Council in its 53<sup>rd</sup> meeting held on 29<sup>th</sup> May, 2007 adopted a resolution to launch food security mission comprising of rice, wheat and pulses to increase the production of rise by 10 million tons, wheat by 8 million tons and pulses by 2 million tons by the end of Eleventh Plan. According to National Food Security Mission has been launched since Rabi 2007 with a financial outlay of Rs. 4882 crores. NFSM is under implementation in 312 district of 14 states.

**Micro Irrigation Scheme (2007):**

The main objective of this scheme was to improve water use efficiency through drip and sprinkler irrigation.

**National Research Centre for Women in Agriculture (NRCWA):**

The National Research Centre for women in Agriculture has been functioning at Bhubaneshwar, Orrisa, for developing methodologies for identification of gender implications in farming systems approaches and develop women specific technologies under different production system.

**Other Initiatives :**

Providing subsidy for the farmers has played a great role in encouraging the farmers to adopt moderns' technologies in agriculture.

Horticulture is the key component to double the agriculture growth from less than 2% in 10<sup>th</sup> five year plan to more than 4% in 11<sup>th</sup> five year plan. The national Horticulture mission covered state and three UTs during the eleventh plan.

Existence of infrastructural facilities has its own contribution in agriculture. Infrastructure facilities have been expended to provided education and information to the farmer a part from providing credit. An important measure was the expansion of institutional credit to reform through co-operative and commercial banks. National bank of Agriculture and rural development (NABARD) has added a golden chapter in the history of agriculture development.

To regulate the price of a number of agriculture commodities like wheat, paddy etc. the commission for agriculture cost and price (CACP) was established by the government. CACP has taken positive steps to insure fair return to the farmers.

Agriculture credit which was introduced earlier got a new impetus in August 1998 with the introduction of Kissan Credit Card scheme. KCC was introduced to provide adequate and timely Credit support to the farmers from the banking system. According to an estimate about 8.95 lakh KCC's have been issued till December 2010. Now farmers can receive crop loan upto a principal amount of 3 lakhs.

Promotion of sustainable self help groups to adopt farming ventures such a dairy farming, mushroom production, fish production, beekeeping and food procession. These SHGs also take the task of input delivery among the group members, contract farming and marketing of their produce.

To increase agriculture productivity agricultural research institutes were established in the country. The research institute developed High Yielding seeds which brought a great change in the agricultural sector. The high yielding variety programme got tremendous success in the country.

**There are many challenges :**

- How to maximize agricultural income while adopting a more sustainable agricultural strategy. The concerns here are land and water degradation due to soil erosions, soil salinity water logging, and excessive application of nutrients. There are concerns arising also from over exploitation of water resources, especially in the green revolution belt.
- Climate change and extreme weather events with greater intensity and frequency can have serious implications for our agriculture sector and create greater instability in food production and thereby farmers livelihood.
- Declining per capita availability of food grains has been a major concern in India.
- The pace of agricultural growth in eastern and north-eastern region has been slower than in the rest of the country.
- Another critical issue is supply chain management in agricultural marketing in India. Farmers' access to markets is hampered by poor roads, rudimentary market infrastructure and excessive regulation many agricultural crops are perishable in-nature and post-harvest handling issues and marketing problems affected the farms incomes.

For the enhancement of agricultural production, Government has formulated various subsidies schemes which look very much attractive from outside. But there is no clarity in the mandate for subsidies on power and fertilizers.

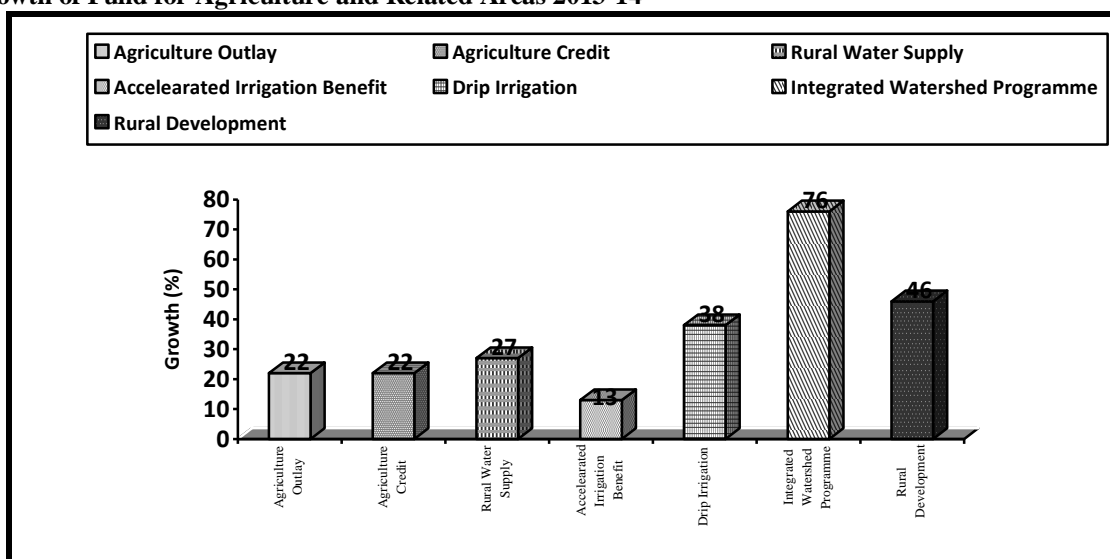
In the recent part, it has been found that various ministry were unable to utilized the funds that has been allocated to them. This clearly indicates failure at the time of implementation or lack of administrative efficiency in executing the proposed plan. This could be one of the reasons of low economic growth rate in India.

**Table-4 Growth of Fund for Agriculture and Related Areas 2013-14**

| Sl.No. | Sectors/Schemes                | Growth in% |
|--------|--------------------------------|------------|
| 1.     | Agriculture Outlay             | 22         |
| 2.     | Agriculture Credit             | 22         |
| 3.     | Rural Water Supply             | 27         |
| 4.     | Accelerated Irrigation Benefit | 13         |
| 5.     | Drip Irrigation                | 38         |
| 6.     | Integrated Watershed Programme | 76         |
| 7.     | Rural Development              | 46         |

Source: Authors Compilation from Budget Documents and Media Reports

**Growth of Fund for Agriculture and Related Areas 2013-14**



**Fig-1 Graphic Representation of Growth**

The current need and welfare of growing population of India also demand for higher fund allocation. This is imperative for inclusive and sustainable development.

## II. SUGGESTIONS:

- Indian agrarian policy requires drastic reforms to achieve food production and shift priorities and strategies to propel Indian agriculture to higher growth trajectory.
- The share of output of non-crop sectors like forestry and animal husbandry in the total agricultural output is on the increase. There has been a change in cropping pattern and attitude of the farmers. The dissemination of new technologies through mass media has played an important role.
- Improvement in agricultural sustainability will require the optimal use and management of soil fertility and soil physical properties both rely on soil biological process and soil biodiversity. This implies management practices that enhance soil biological activity and thereby build up long terms soil productivity and health.

- Climate change is going to have great impact on agriculture world over and there is need for such technologies to cope up the changes in the climate. It has necessitated the need for the research which identifies the different crops for different type of biotic stresses.
- A communication system that provides information about agricultural policies markets and weather, credit and crop insurance services is important knowledge has to be synergized at the village level through "Farm knowledge centres" in which Panchayat Raj institutions can play a critical role. Community Radio Station can be an effective and cheap tool for agriculture and rural development. Village knowledge centres and online databases in local languages should be established.
- Public sector agricultural research has to be strengthened and reoriented particularly towards dry land crops.
- The public distribution system must be strengthened so as to make available basic, minimum quantities of cereals at affordable prices to all vulnerable households.
- The agriculture marketing department must take measures to provide adequate non-exploitative arrangements in market yards.
- The state governments should consciously promote and facilitate the production and usage of Bio Fertilizers, vermin, composting, green manuring and then eco friendly fertility enhancing activities.
- The state governments have to play a crucial role in ensuring the provision of high quality inputs at affordable prices at the right time to all cultivators.
- The agriculture technology mission (ATM) must act as an umbrella for planning direction and implementation of all of the policies relevant to agriculture and allied sectors and the welfare of farmers and farm workers.
- The public extension network has to be reviewed and strengthened. This will involve large scale recruitment and training of adequate qualified staff.

### **III. CONCLUSION**

In the conclusion I can say that by the adoption of the more public investment in the agriculture sector, production and distribution of quality seeds to the growers/farmers, development of irrigation infrastructures : integrated plan nutrients supply, maintain soil biodiversity of increased agricultural production; adoption of integrated pest management assured price to the farmers/growers for their produce accessibility to the free market for the farmers/growers for sale of their agricultural producer.

Studied and survey point out deficiencies in planning, implementation and monitoring, despite programme are conceptually well thought of establishing lack of concern commitment and accountability of implementers. It is necessary to revisit concept, planning and approach towards rural development programme.

Everything can wait but agriculture cannot wait as it is linked to the bread and butter of more than one billion population of this country. Hence agriculture should continue to receive the first priority and best and dedicated efforts of everybody in the ladder of governance and decision making in the field.

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