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INDIAN ECONOMY VOL: 2

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INDIAN AGRICULTURE-AN INTRODUCTION

Introduction

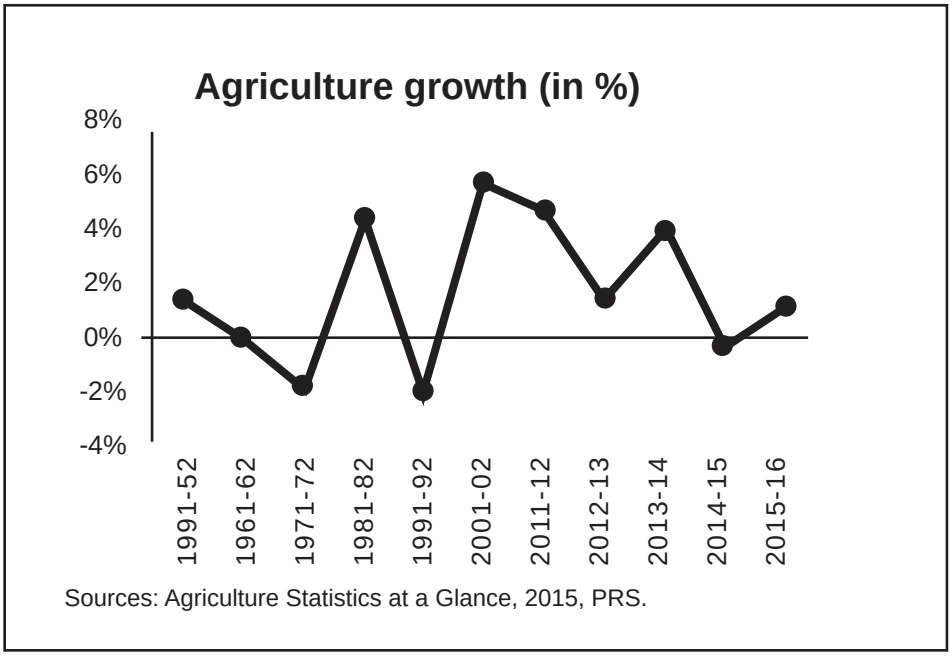
Agriculture occupies a key position in all economies irrespective of their level of development. It satisfies certain basic needs of human beings by fulfilling their food and non-food demands. It supplies: i) foodgrains such as rice, wheat, coarse cereals and pulses, ii) commercial crops such as oilseeds, cotton and sugarcane, iii) plantation crops such as tea and coffee, and iv) horticultural crops such as fruits, vegetables, flowers, spices, cashewnut and coconut. In addition to these, certain allied activities such as milk and dairy products, poultry products and fishery are included in the agricultural sector. Most of the developed and industrialised countries received their initial spurt for industrial advancement from agriculture.

The agriculture sector has a very important role to play in making India a five trillion dollar economy. Agriculture, therefore, continues to be regarded as an important sector to be focused upon in the overall policy thrust of the country. It is estimated that for every additional rupee generated by agricultural production, the various economic linkages in the rural areas add another three rupees to the income. In addition, its multiplier effects influence many of the secondary and tertiary sectors of the urban economy (e.g. industry, transportation, banking, etc.). Although the relative importance of agricultural sector in the total GDP of the Indian economy has registered a marked decline over the last six decades, even at this juncture, for the much desired double-digit growth of the economy to happen, it is estimated that a growth of Indian agriculture by close to 4 percent is essential.

Basic facts about Indian agriculture

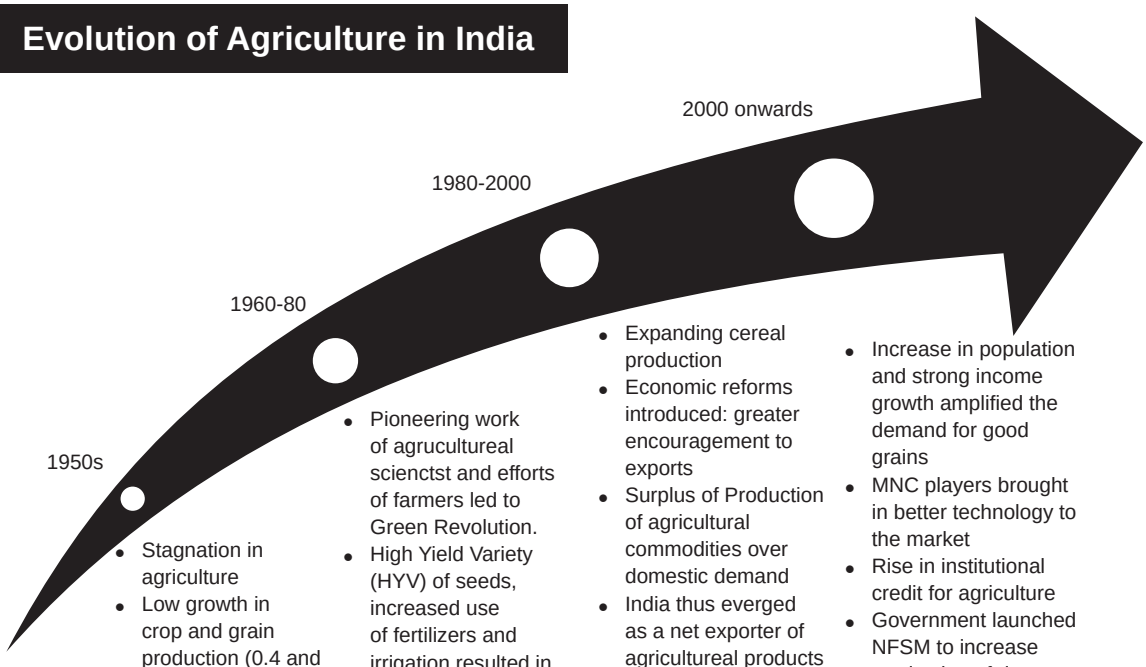
- India rank 2nd in the world in agriculture production.
- As per 2018, agriculture employed more than 50% of the Indian work force and contributed 17–18% to country's GDP.
- In 2016, agriculture and allied sectors like animal husbandry, forestry and fisheries accounted for 15.4% of the GDP (gross domestic product) with about 41.49% of the workforce in 2020.
- India ranks first in the world with highest net cropped area followed by US and China.
- Globally India ranks 9th for the agricultural exports.
- India is the largest milk producer, 2nd largest in vegetables and fruits, 3rd in fish production, 4th largest in egg and 5th in poultry production in the world.
- Indian agriculture is multifaceted, with horticulture and animal husbandry contributing to over 60% of India's agricultural GDP.

- India is currently the world's second largest producer of several dry fruits, agriculture-based textile raw materials, roots and tuber crops, pulses, farmed fish, eggs, coconut, sugarcane and numerous v egetables.
- With around 55% of India's arable land dependent on precipitation.



Sources: Agriculture Statistics at a Glance, 2015, PRS.

Evolution of Agriculture in India



1950s
- Stagnation in agriculture
- Low growth in crop and grain production (0.4 and 0.1 per cent p.a.)
- Food grain production of 59.2 mt in 1952-53, with a yiled of 579.8 kg/ha

1960-80
- Pioneering work of agrucultureal scienctst and efforts of farmers led to Green Revolution.
- High Yield Variety (HYV) of seeds, increased use of fertilizers and irrigation resulted in a significant spike in prodction.
- Attained food security and reduced import of food grains.

1980-2000
- Expanding cereal production
- Economic reforms introduced: greater encouragement to exports
- Surplus of Production of agricultural commodities over domestic demand
- India thus everged as a net exporter of agricultureal products

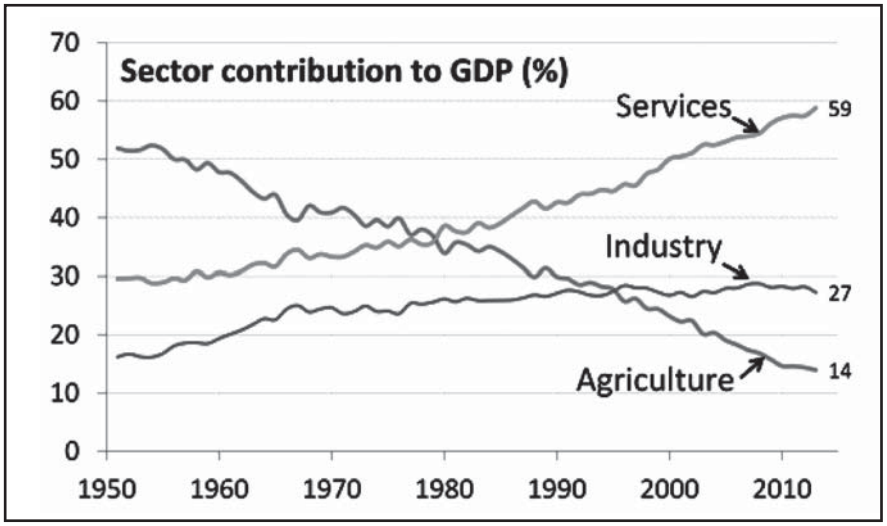
2000 onwards
- Increase in population and strong income growth amplified the demand for good grains
- MNC players brought in better technology to the market
- Rise in institutional credit for agriculture
- Government launched NFSM to increase production of rice, Wheat and pulses

Source: RB, Ministry of Agriculture, Aranca Research
Notes NFSM - National Food Security Mission.
MNC - Multi National Company mt - metric tonner, per annum

Role of Agriculture in Indian Economy

Share in National Income:

- After the initiation of planning in India, the share of agriculture has persistently declined on account of the development of the secondary and tertiary sectors of the economy. From 55.3 per cent in 1950-51, the share of agriculture in GDP at factor cost declined steadily to 37.9 per cent in 1980- 81.



- The share of agriculture and allied activities in GDP is 17 per cent in 2013-14. The share of agriculture in national income is often taken as an indicator of economic development. As the country progresses, the dependence on agriculture declines.

Largest Employment Providing Sector

- In 1951, 69.5 per cent of the working population was engaged in agriculture. This percentage fell to 56 per cent in 2001. In 2013, agriculture provided employment to 54 per cent of the work force. However, with rapid increase in population the absolute number of people engaged in agriculture has become exceedingly large.

Contribution to Exports

- Another indicator of the role of agriculture in an economy is the contribution it makes to exports. As industrial growth takes place and there is a steady change in the composition of exports, infavour of manufactures and services.

Providing Raw Materials to Industries

- Agriculture provides raw materials to various industries of national importance. Sugar industry, jute industry, cotton textile industry, vanaspati industry are examples of some such industries which depend on agriculture for their development. The entire range of food processing industries is similarly dependent on agriculture.

Contribution to Other Sectors

- An equally significant criterion to gauge the role and importance of agriculture is the contribution it makes to the growth of the non-agricultural sectors. As it is the source of raw materials for a number of industries and also supplier of food for the workers who are engaged in non-agricultural sectors.

Addresses Malnutrition and provides food security:

- Agriculture holds a key to **reducing India's malnutrition problem,** directly affecting public health and worker productivity.

Role of Agriculture in making India $ 5 trillion economy

- Farm and allied sector have a huge potential to play a key role in making India a $ 5 trillion economy.
- To achieve this mammoth national target, all sectors of economy viz., agriculture, industry and service have to outperform outstanding.
- Farmers should focus on developing agri-allied activities such as animal husbandry, bee-keeping and horticulture to double their incomes.
- Farmers must adopt scientific farming, increase the use of technology and mechanisation in agriculture to achieve this goal.
- Cooperative farming as it can play key role in achieving $5 trillion economy. Some cooperatives like IFFCO and Amul have been able to operate on a large scale in the country as well as compete at global level.
- Farmers should focus on per drop, more crops. The farmers need to bring down the cost of farming, increase the yields and adopt advanced irrigation technologies such as drip irrigation and solar energy to increase their earnings.
- Stringent quality control measures for warehouses are needed apart from increasing their capacity. The first step would be more appropriate for exports so that cases of rejections are not there. The second step is critical to stop crop damage due to a lack of adequate cold storage space.
- Indian farming is still dependent mainly on the Monsoon factor. More up-gradation for the forecasting agency, the IMD (Indian Meteorological Department) is needed. Better and timely decision making for farmers as to which crop to sow would be beneficial not only for them but also Bankers (who provide loans) and in effect, benefit the Indian economy as a whole.
- Exports are highly lucrative and can help raise farmer income significantly. For that, newer markets need to be developed. More export incentives need to be given so that farmers can avail of more benefits and export demand too rises. To achieve this target, our total export should be of $1.0 trillion annually and share of agriculture and the allied sector should be 10 %.
- Raising crop productivity gains more prominence when we consider the fact that rapid urbanization is ensuring a fall in the cultivable area. Focus is need for small farmers who have low area fields, which if merged can result in higher crop productivity.
- To achieve $100 million agri-export, smart agriculture is pivotal to sustain our products at international level. Agritech startup can play a vital role in this endeavour; however, the bottleneck should be removed within the least possible time.
- Unfortunately, due to worldwide attack of global pandemic of Covid- 2019 disease, every sphere of life has been severely paralysed. Agriculture sector was less affected as the food grain output was recorded highest ever (295.67MT) and sector growth 3.7 % in absolute term and 11.3% on the current price, during 2019-20.

Major Problems of Indian Agriculture

Uncertainties and Fluctuations in Agricultural Production

- Agriculture in India continues to remain predominantly rainfed. Fluctuation in the quantity, frequency and timing of rainfall from year to year is a common feature in India. Thus there is some uncertainty in the availability of an essential input, i.e., water. The fluctuation in rainfall causes fluctuations in agricultural production and thereby in the GDP of India.
- Uneven spread of rainfall across regions further adds to these fluctuations. The economy often witnesses drought conditions in some regions while some other regions are devastated by floods in the same year.

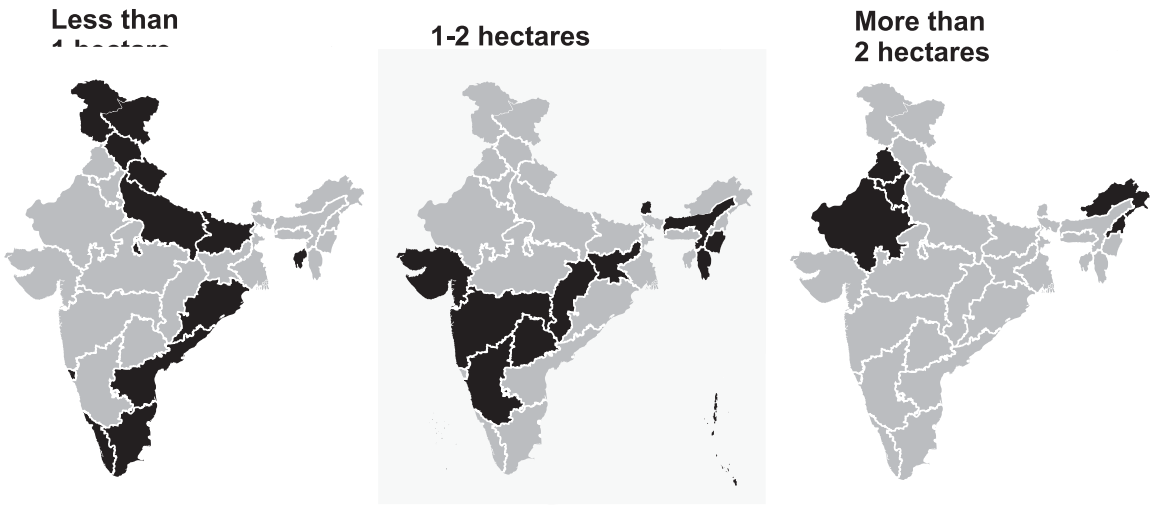
Wide Diversities

- Indian agriculture is characterised by large diversities across regions. The climatic and soil conditions vary from the arid desert in Rajasthan to the high rainfall and extremely wet conditions in Assam and Meghalaya. There is, therefore, a multiplicity of crops and some degree of inter-regional specialisation in agricultural production.
- Furthermore, there are diversities in the productivity of land not only between regions but also within a region. Hill districts of Uttar Pradesh have agro-climatic conditions which are very different from that in the plains of the same state. Even within the plains there are wide differences in fertility and soil conditions between the eastern and the western parts of the state.

Small and fragmented land-holdings

- A large number of cultivators are operating on very small or tiny farms. In the year 1990-91, about 60 per cent of the farms were of less than one hectare in size and almost 78 per cent of the farms were of 2 hectares or less in area. This is primarily attributed to the pressure of growing population on agriculture which causes subdivision and fragmentation of the farms.
- The problem of small and fragmented holdings is more serious in densely populated and intensively cultivated states like Kerala, West Bengal, Bihar and eastern part of Uttar Pradesh where the average size of land holdings is less than one hectare and in certain parts it is less than even 0.5 hectare.
- Rajasthan with vast sandy stretches and Nagaland with the prevailing 'Jhoom' (shifting agriculture) have larger average sized holdings of 4 and 7.15 hectares respectively. States having high percentage of net sown area like Punjab, Haryana, Maharashtra, Gujarat, Karnataka and Madhya Pradesh have holding size above the national average.

In 12 Indian states, the average farm size is less than a hectare



Predominance of Subsistence Farming

- A large number of small and marginal farmers do not produce enough for the needs of the families working on them. They are known as subsistence farmers. Production for sale in the market is confined only to larger farms. There is, thus, a mixture of subsistence farming and commercial farming. Benefits of state policies like price support and subsidies are available to the large farmers who are engaged in commercial farming and not to the small farmers who are engaged in subsistence farming.

Low Level of Productivity

- Low level of productivity has been one of the symbols of backwardness of Indian agriculture. Despite several technological improvements and spread of new agricultural technology the overall level of

productivity has remained low. Compared to developed countries productivity per worker as well as per hectare in India is very low. For instance productivity per hectare in the case of rice, which is a major crop of India, was only 29 quintals in India as compared to 63 quintals in USA, 62 quintals in Japan, 61 quintals in China in the year 1998.

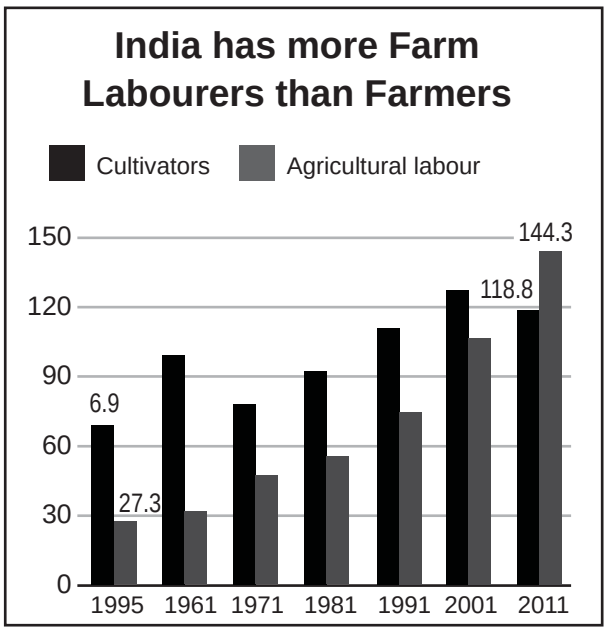
- For other major crops like wheat, groundnut and cotton, the situation is very much similar. Low productivity not only aggravates the pressure on land but also keeps the cost of production very high.

Cropping Pattern

- The crops that are grown in India are divided into two broad categories: food crops and non-food crops. While the former comprise food-grains, sugarcane and other beverages, the latter includes different kinds of fibres and oilseeds. In recent years there has occurred a fall in agricultural production mainly due to fall in the output of non-food articles.

More farm labourers than farmers

- The 2011 Census showed, for the first time, landless agriculture labour outnumbered cultivators in the agricultural workforce - which consists of these two categories of workers. They constituted 55 per cent of the workforce and numbered 144.3 million, as against 45 per cent or 118.8 million of cultivators. It is tough to drive or sustain growth in agriculture since farm labourers get no policy support or incentive to invest in farming.



Irrigation

- About 80 per cent of the current water use is drawn by agriculture. Irrigated area accounts for nearly 48.8 per cent of the 140 million hectare (mha) of agricultural land in India. The remaining 51.2 per cent is rainfed. The gap between irrigation potential created, through major and minor projects, and the actual usage is increasing and affecting the country's agricultural productivity, according to the Indian Council of Agriculture Research (ICAR),
- The key challenge facing the irrigation sector in India is the growing gap between Irrigation Potential Created (IPC) and Irrigation Potential Utilised (IPU), and uneven distribution of water over the length of the canal system.

Lack of knowledge about latest methods and technology

- A majority of Indian farmers are smallholders who rely on traditional resource-intensive farming techniques. They have limited access to modern machinery, logistics and storage facilities, and information such as data on weather patterns, soil health, and protection of crops.

Agricultural Marketing

- Agricultural marketing still continues to be in a bad shape in rural India. In the absence of sound marketing facilities, the farmers have to depend upon local traders and middlemen for the disposal of their farm produce which is sold at throw-away price. In most cases, these farmers are forced, under socio-economic conditions, to carry on distress sale of their produce. In most of small villages, the farmers sell their produce to the money lender from whom they usually borrow money.

Inadequate storage facilities

- Storage facilities in the rural areas are either totally absent or grossly inadequate. Under such conditions the farmers are compelled to sell their produce immediately after the harvest at the prevailing market prices which are bound to be low. Such distress sale deprives the farmers of their legitimate income.
- The Parse Committee estimated the post-harvest losses at 9.3 per cent of which nearly 6.6 per cent occurred due to poor storage conditions alone. Scientific cold storage chain is, therefore, very essential to avoid losses and to benefit the farmers and the consumers alike.

Inadequate transport

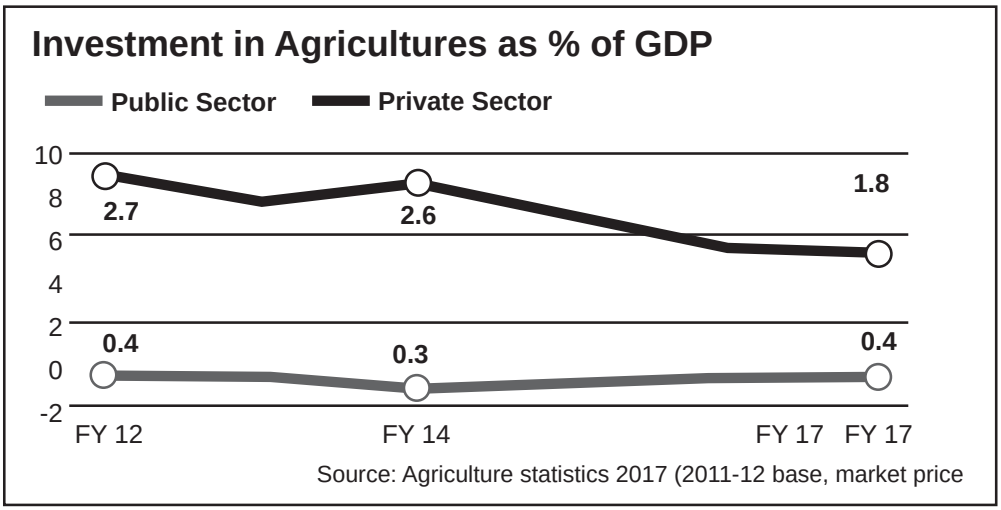
- One of the main handicaps with Indian agriculture is the lack of cheap and efficient means of transportation. Even at present there are lakhs of villages which are not well connected with main roads or with market centres.

Scarcity of capital

- The role of capital input is becoming more and more important with the advancement of farm technology. Since the agriculturists' capital is locked up in his lands and stocks, he is obliged to borrow money for stimulating the tempo of agricultural production.
- The main suppliers of money to the farmer are the money-lenders, traders and commission agents who charge high rate of interest and purchase the agricultural produce at very low price.

Falling Investment in Agriculture

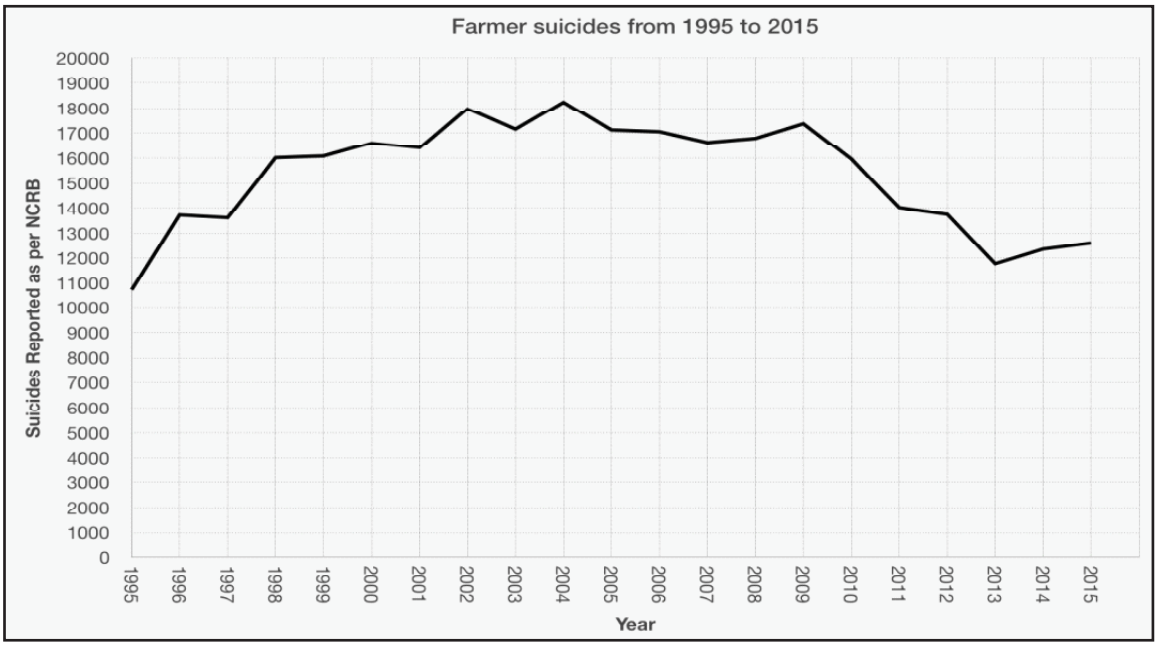
- The period for which comparative data are available - public investment remained more or less static at 0.3-0.4% of the GDP (2011-12 base, market price) while private investment fell from 2.7% to 1.8% - dragging the overall investment from 3.1% of the GDP to 2.2%. One of the reasons for low growth is low investment.



Farmer suicides

- Farmer suicides in India refers to the national catastrophe of farmers committing suicide since the 1970s, often by drinking pesticides, due to their inability to repay loans mostly taken from private landlords and banks. Farmer suicides account for 11.2% of all suicides in India. The farmer's suicide rate in India had ranged between 1.4 and 1.8 per 100,000 total population, over a 10-year period through 2005, however, the figures in 2017 and 2018 showed an average of more than 10 suicides daily.

- Various reasons have been offered to explain why farmers commit suicide in India, including: , floods, drought, debt, use of genetically modified seeds, public health, use of lower quantity pesticides due to less investments producing a decreased yield. There is no consensus on what the main causes might be but studies show suicide victims are motivated by more than one cause, on average three or more causes for committing suicide, the primary reason being the inability to repay loans.



Soil erosion:

- Large tracts of fertile land suffer from soil erosion by wind and water. This area must be properly treated and restored to its original fertility.

Water use is excessive in rice cultivation

- Farmers in India are using 25 times the amount of water that agricultural scientists say is needed to produce paddy. Improper irrigation methods and misconceptions are the stated reasons for the high wastage of a scarce resource.

Groundwater overuse

- India has faced increased variation in rainfall, frequent droughts and rapidly depleting groundwater. As groundwater levels fall, the structure of electricity tariffs mean that farmers face no additional charge for extracting more water. This allows farmers to invest in deeper wells and stronger pumps, pushing groundwater levels lower. Deeper wells do not just hurt the environment but can also increase the cost borne by farmers.

The invisibility of gender in Indian agriculture

Some facts on women engaged in agriculture

- Agriculture sector employs 80% of all economically active women in India; they comprise 33% of the agriculture labor force and 48% of the self-employed farmers.
- In India, 85% of rural women are engaged in agriculture, yet only about 13% own land. The situation is worse in Bihar with only 7% women having land rights, though women play an important role in various agricultural activities.
- Economic Survey 2017-18 says that with growing rural to urban migration by men, there is 'feminisation' of agriculture sector, with increasing number of women in multiple roles as cultivators, entrepreneurs, and labourers.

- Bihar's agriculture sector is highly feminized, with 50.1% of the total workforce engaged in farming activities being women ('Women in the informal economy of Bihar' – ADRI)
- About 60-80% food are produced by rural women.

Empowering Women in Agriculture

- Women in agriculture are affected by issues of recognition and in the absence of land rights, female agricultural labourers, farm widows, and tenant farmers are left bereft of recognition as farmers, and the consequent entitlements.
- The root of the problem begins at the official level because of lack of recognition of the female agricultural worker, and the resultant exclusion from rights and entitlements, such as institutional credit, pension, irrigation sources, etc. According to the India Human Development Survey (IHDS, 2018), 83 per cent of agricultural land in the country is inherited by male members of the family and less than two per cent by their female counterparts.
- Women's work in agriculture is in addition to her role as a wife, a daughter-in-law and as a mother. However, gender based discrimination continues in multiple ways: women are not recognized as farmers in Indian policies thereby denying them of institutional supports of the bank, insurance, cooperatives, and government departments.
- The Sustainable Development Goal (SDG #5. a.1), seeks to grant property rights and tenure security of agricultural land to women. Policy paralysis in granting entitlements to women in agriculture and farm widows needs to be addressed to empower rural women economically, politically, socially, and psychologically.
- The most critical issue that needs to be addressed toward a gendered friendly policy is to minimise the gap between ownership versus control of land by addressing patriarchal conventions and bottlenecks in interpersonal legislations, to achieve economic equality in gender, as also guaranteed by the Indian Constitution, under the aegis of Article 14.

COVID and Indian agriculture

- COVID-19 pandemic has influenced the lives of people across the globe and India is no exception to that. The farming activities also experienced the impact of this pandemic as the COVID induced lockdowns influenced the movement of farm inputs including farm machinery from one location to other. The national lockdown coincided with the commencement of the harvesting season for the Rabi crops creating further adversity for the sector.
- The COVID-19 crisis has exposed the vulnerability of India's Agri food system and accentuated the need for agricultural market reforms and digital solutions to connect farmers to markets, to create safety nets and ensure reasonable working conditions, and to decentralize Agri food systems to make them more resilient.
- Migration of agricultural labourers to their native places during the lockdown created a shortage of farm labourers. India's agricultural system demonstrated its resilience amid such adversities. The agriculture and allied sectors were the sole bright spot amid the slide in performance of other sectors, clocking a growth rate of 3.4 per cent at constant prices during 2020-21.
- Against all adversities due to COVID-19, continuous supply of agriculture commodities, especially staples like rice, wheat, pulses and vegetables, has been maintained thereby enabling food security. In order to further strengthen and support the agricultural sector, several initiatives have been taken by the Government of India under the AtmaNirbhar Bharat Abhiyan

Determinants of agricultural Development

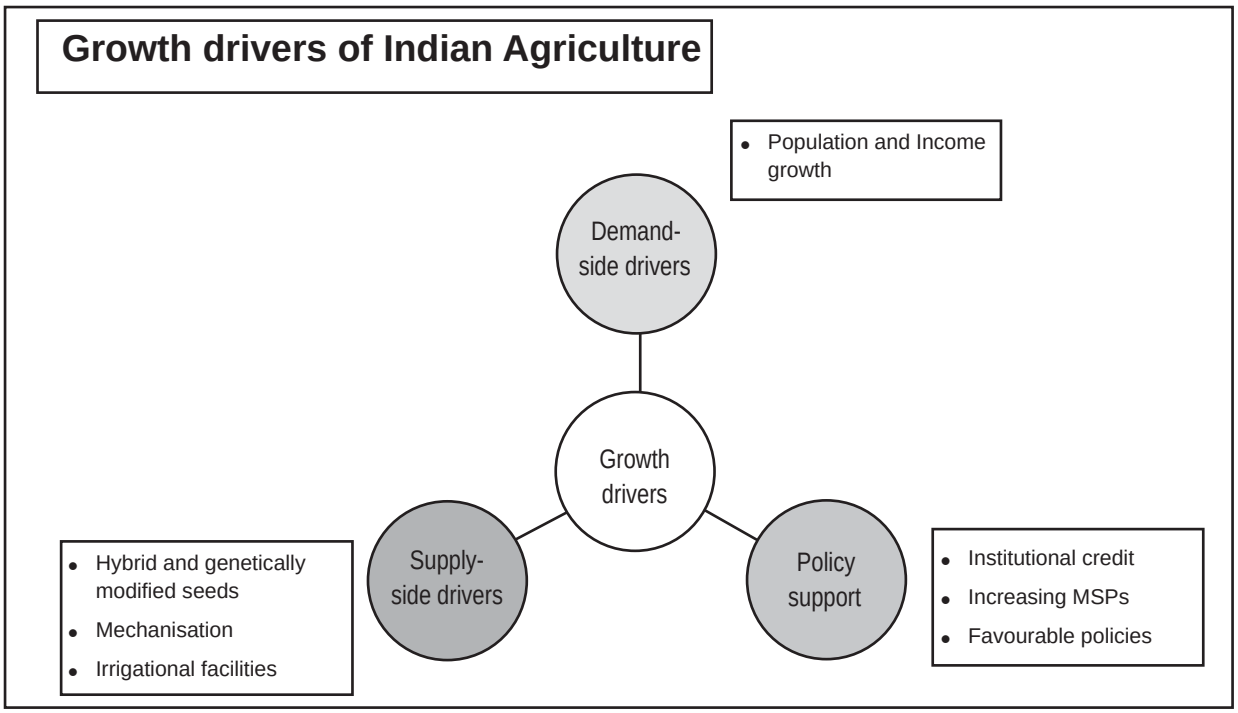
- The factors affecting agricultural development are varied. They encompass: physical, technological, economic, socio-cultural, institutional, organisational and political factors. good 'rural infrastructure' is recognised as

critical in enhancing agricultural output and productivity. Under this comes many specific factors like: roads, irrigation, electric supply, banking, communications, etc.

- A more specific variant of agricultural infrastructure is 'social infrastructure' encompassing factors like: education and health facilities, extension services and information dissemination systems, participatory mechanisms, investments in agricultural research and technology.

Strategy of Reforms in Agriculture

We have almost all that it takes to be agricultural superpower – abundant sunshine, adequate rainfall, varied agro-climatic conditions and biodiversity.



Following measures should be taken to improve the condition of agriculture in India

Pricing Policy

- Macro-economic policy measures that may not be directly aimed at agriculture sector, can nevertheless affect the sector in a big way altering the production as well as social relations. These policies have been affecting the Indian agriculture, particularly through movements in terms of trade and through pricing, fiscal, credit and exchange rate policies. These issues have recently acquired added importance because of the on-going structural adjustment process.
- Fiscal, monetary, exchange rate and credit policies can sizably affect the agricultural price scenario and through a feedback relationship affect all the sectors of the economy, including agriculture. A plausible approach to meet the challenge posed by the pricing dilemma is to remove the present negative protection to the agriculture sector and let prices correct themselves through increases staggered over the next few years.
- But, while allowing for such increases, it is immensely important that the poor and the vulnerable sections of population are provided a meaningful and workable safety net. This can only be achieved through increased allocation to poverty alleviation and employment generation programmes and through strengthening the Public Distribution System (PDS) to a narrowly targeted population.
- Input Supplies

- Fertilizer use is concentrated in a few crops and few regions and it is skewed in favour of rich farmers. Therefore, the benefit of these subsidies to farming community is highly skewed. The Government will have to reduce these subsidies in a phased manner.
- Increasing irrigation investment is a more efficient way to raise agricultural output than subsidising fertilizers. The issues related to irrigation are important in themselves. Low levels and poor collection of water charges, unsatisfactory maintenance and burgeoning establishment have plagued the functioning of irrigation systems in the country.
- Improved technology is most important for the growth of output. Available evidence shows that there is a big gap between the level of yield with improved farm practices in farmers' fields and the yield with practices followed by the farmers.
- Besides the need for extension to transfer improved technology to farmers, the critical factor in this is the availability of quality seeds. India needs to develop a competitive market for seeds by expanding the role of public sector and by encouraging private sector in seed business in a big way. We feel that transferring some of the subsidies from other inputs to seed would be more paying.

Multiple cropping

- Multiple cropping aims at maximizing production per unit of land and per unit of time by taking three or four crops in a year. By adopting multiple cropping, there are two advantages as of getting increased returns and economy of the farm resources.

Agricultural Credit

- Revitalising the rural credit structure is important for agriculture growth as money lenders still appear to be an important source of credit. It nevertheless appears that there is a need to study the factors affecting the access of institutional credit to small farmers. It is important that credit delivery is made timely and is regulated to efficient productive channels.
- Reform of credit institutions should touch all levels of co-operative as well as commercial banking sector. The longstanding problem of unviable Regional Rural Banks (RRBs) also needs to be resolved.

The Pradhan Mantri Kisan Samman Nidhi Yojana (PM-Kisan Yojana) :

- It is a government scheme through which, all small and marginal farmers will get up to Rs 6,000 per year as minimum income support. This 75,000-crore scheme aims to cover 125 million farmers, irrespective of the size of their landholding in India.

Agricultural Marketing

- Provide sizable government support to agricultural marketing activities; market systems remain inefficient and even primitive to some extent. Price support operations are biased in favour of wheat and rice crops and even in these crops they are almost non-existent in case of deficit States.
- Market intervention programmes exist for sugar and cotton also but are inefficiently conducted. At the same time, one has to be cautious in commercialising Indian agriculture, as it may unduly benefit the endowment-rich regions.

Food Stock Operations

- There has been a sharp increase in economic cost of food grains handled by the Food Corporation of India (FCI). The problem is compounded by the increasing gap between economic cost and procurement prices indicating a steep rise in procurement and distribution incidentals. In addition there is an element of credit subsidy to the FCI that is not explicitly accounted for in its cost.
- A key issue in food stock operation is the optimal level of stocks that the public agencies need to maintain. Very little effort has been made to systematically compute the optimal stock levels. The newly set norms require another look. The question needs to be examined in an integrated framework of not only the stock level, but also the procurement and off-take policies. A decision to restrict PDS off-take to a narrower target group must precede the exercise of setting stock norms.

Technology and Sustainability

- There are several dimensions to the issue or technology absorption, land use and sustainability of agricultural growth. Investments will have to be made not only in technology but also in removing attendantconstraints, so that growth in these areas becomes sustainable over the mediumand long-term.

Farm Mechanisation:

- It refers to the development and use of machines that can take the place of human and animal power in agricultural processes with the end objective to enhance the overall productivity and production with the lowest cost of production.
- Farm mechanisation in India stands at about 40- 45% with states such as UP, Haryana and Punjab having very high mechanisation levels but north eastern states having negligible mechanisation. However, it has been lower in India compared to other countries such as USA (95 per cent), Brazil (75 per cent) and China (57 per cent).

Institutional Arrangements

- On the credit side there is a need for appropriate institutional mechanisms to enhance lending for both production and long-term investment purposes. The crop insurance scheme may be re-cast by enhancing in its coverage and including more remunerative cash crops in order to cross-subsidise its operations.
- On the marketing side, steps may be initiated to improve marketing network for coarse cereals on a regional basis for distribution operations and for this NAFED needs to be treated on par with FCI for all practical purposes.

PPP (public private partnership) models

- For capital constrained countries, the PPP (public private partnership) models of attracting investment is considered a viable option to improve the infrastructural facilities that are so vitally required for agricultural development.

Sustainable agriculture

Agriculture often places significant pressure on natural resources and the environment. Sustainable agricultural practices are intended to protect the environment, expand the Earth's natural resource base, and maintain and improve soil fertility. Based on a multi-pronged goal, sustainable agriculture seeks to:

- Increase profitable farm income
- Promote environmental stewardship
- Enhance quality of life for farm families and communities
- Increase production for human food and fiber needs

Climate-smart agriculture (CSA)

- Climate-Smart Agriculture (CSA) takes into consideration the diversity of social, economic and environmental contexts, including agro-ecological zones. Implementation requires identification of climate-resilient technologies and practices for management of water, energy, land, crops, and livestock.
- In 2015, the United Nation's 17 Sustainable Development Goals (SDGs) were unanimously backed and supported by governments all over the world. The ''End of Hunger'' SDG focuses on promoting sustainable agriculture. One of the SDG's 2030 target is to ensure full implementation of sustainable food production systems and resilient practices to double the agricultural productivity and incomes of small-scale food producers.
- The Intergovernmental Panel on Climate Change (IPCC) has highlighted that future agricultural growth will be impacted by climate change. This phenomenon leads to increase in frequency and intensity of extreme events such as drought, heavy rainfall, flooding and high maximum temperatures. Water scarcity and dry regions are likely to increase significantly by the end of the century.

- Climate change could hurt farmers' income by up to 20-25% in the medium term. CSA is an approach for developing agricultural strategies to secure sustainable food security under climate change. Hence, climate smart agriculture must be adopted.
- Foreseeing the future risks of climate change, the Government of India is implementing the National Mission of Sustainable Agriculture (NMSA), one of the eight missions under the National Action Plan on Climate Change (NAPCC). Parallelly, the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) envisages "Per Drop More Crop", that is, promoting micro/drip irrigation to conserve water. There is also a push to cluster-based organic farming through the Paramparagat Krishi Vikas Yojana (PKVY).

Conclusion

There should be strong policies to boost the productivity of the agricultural sector. Similarly, the welfare of the small and marginalized farmers should also be taken into consideration. In recent time the introduction of crop insurance (Pradhan Mantri FasalBima Yojana) seems to be a good initiation. However, the effectiveness of the scheme can only be analyzed after its implementation.

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