EduTap

SUMMARY SHEET

Indian Agriculture

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1 Introduction

Agriculture plays a vital role in India's economy. **54.6% of the total workforce** is engaged in agriculture and allied sector activities which accounted for a sizeable **18.8 per cent (2021- 22) in Gross Value Added (GVA)** of the country registering a growth of 3.6 per cent in 2020-21 and 3.9 per cent in 2021-22. India is still largely a rural economy with 66 percent of the country's population living in rural areas and agriculture continues to be the mainstay of a large segment of this section of the population. India is among the 15 leading exporters of agricultural products in the world. As per Agriculture Census 2015-16, **the average size of operational holding has declined to 1.08 hectare in 2015-16** as compared to 1.15 hectare in 2010-

11. The small and marginal holdings (<2 ha) now constitute 86%, while the large holdings (>10 ha) are merely 0.57% of the total land holdings.

2 Agriculture Characteristics

The history of Agriculture in India dates back to **Indus Valley Civilization** and in some parts of Southern India, it was found to be practised even before the Harappans. Features of Indian Agriculture are as follows:

- **Source of livelihood**: About 54.6 per cent of the total workforce in the country is still engaged in agricultural and allied sector activities which accounts for approximately 18.8 per cent of the country's Gross Value Added (GVA) for the year 2021-22 (at current prices).
- **Dependence on monsoon**: Agriculture in India mainly depends on monsoon. If monsoon is good, the production will be more and if monsoon is less than average then the crops fail. Sometimes floods play havoc with our crops. As **irrigation facilities are quite inadequate**, the agriculture depends on monsoon.
- **Labour intensive cultivation**: Due to increase in population, the pressure on land holding has increased. Land holdings get fragmentated and subdivided and become uneconomical. Machinery and equipment cannot be used on such farms.
- **Under employment**: Due to inadequate irrigation facilities and uncertain rainfall, the production of agriculture is less, farmers find work a few months in the year. Their capacity of work cannot be properly utilised. In agriculture there is under employment as well as disguised unemployment.
- **Small size of holdings**: Due to large scale sub-division and fragmentation of holdings, land holding size is quite small. Average size of land holding is 1.15 hectares in India while in Australia it was 4,331ha hectares and in USA it was 160 hectares.
- **Traditional methods of production**: In India methods of production of agriculture along with equipment are traditional. It is due to poverty and illiteracy of people. Traditional technology is the main cause of low production.
- **Low Agricultural production**: Agricultural production is low in India. India produces 27 quintals wheat per hectare. France produces 71.2 quintals per hectare and Britain 80 quintals per hectare. Average annual productivity of an agricultural labourer is 162 dollars in India, 973 dollars in Norway and 2408 dollars in USA.
- **Dominance of food crops:** 75% of the cultivated area is under food crops like Wheat, Rice and Bajra, while 25% of cultivated area is under commercial crops. This pattern is cause of backward agriculture.

The various features which were hindering the growth of agriculture have compelled the government to act through technological and institutional reforms, which are discussed in the next topic.

3 Technological and Institutional Reforms

Agriculture has been practised in India for thousands of years. Sustained uses of land without compatible techno-institutional changes have hindered the pace of agricultural development. Realising the importance of agricultural sector in the growth of an economy, the Government of India initiated **technological and institutional reforms** to ensure the increase in agricultural production. They are:

3.1 Technological Reforms

- **The Green Revolution** based on **the use of package technology** and **the White Revolution** (**Operation flood)** were some of the strategies initiated to improve Indian agriculture. (Discussed later)
- Introduction of **High Yielding Varieties** of seeds, chemical fertilisers, insecticides and pesticides.
- Development of surface and **ground water irrigation** and **rural electrification**.
- Introduction of **modern farming tools** and equipment's like power tiller, tractor, harvester etc.
- Special weather bulletins and agricultural programmes for farmers were introduced on radio and television to acquaint farmers with modern farming techniques.

- In the 1980s and 1990s, a comprehensive **land development programme** was initiated, which includes both institutional and technological reforms.

3.1.1 Successful Revolutions

Green Revolution: It **refers to increase in crop production**. It is based on **package technology which include** use of HYV seeds, use of chemical fertilisers, insecticides and pesticides, development of surface and ground water irrigation, farm mechanisation, rural electrification, development of rural roads, and storage facilities for crops.

White Revolution: It **refers to increase in milk production** in the country. It is also called **Operation Flood**. This has been achieved by introducing better breeds of cattle, providing them nutritious food, controlling their diseases etc.

3.2 Institutional Reforms

- Collectivisation, consolidation of land holdings, cooperation etc. were given priority by the government after independence.
- Abolition of **zamindari system** and **land reforms** was the main focus of our first five-year plan.
- Establishment of Grameen Banks, cooperative societies and banks for providing loan facilities to the farmers at lower rates of interest.
- Provision for crop insurance against drought, flood, cyclone, fire and disease.
- The government also announces minimum support price **(MSP)** and remunerative and procurement prices for important crops to check the exploitation of farmers by speculators and middlemen.
- Kisan credit cards and personal accident insurance schemes introduced.

These Technological and Institutional measures have enhanced the agricultural performance. It's time to understand agricultural performance in brief, so that one is well aware of the economic developments that have taken place in agriculture post- independence.

4 Agricultural Performance

Contribution of agriculture to the **national economy, employment and output** is the focus of agriculture performance. Agriculture has been the backbone of the Indian economy though its share in the Gross Domestic Product has registered a declining trend from 1951 onwards.

- **Share in employment**: Agriculture is the largest employment providing sector in India. About 54.6% of the total workforce in the country is still engaged in agricultural and allied sector activities (Census 2011).
- **Share in GDP**: Agriculture and allied sector activities which accounted for a sizeable 18.8 per cent (2021- 22) in Gross Value Added (GVA) of the country registering a growth of 3.6 per cent in 2020-21 and 3.9 per cent in 2021-22.

5 Food security

It means **availability, accessibility and affordability of food to all people at all times.** Food is a basic need and every citizen of the country should have access to food which provides minimum nutritional level. If any segment of our population does not have this access, that segment suffers from lack of food security. The number of people who do not have food security is **disproportionately large** in some regions of our country particularly in **economically less developed states** with **the higher incidence of poverty**. In order to ensure availability of food to all sections of society, the Government of India carefully designed a **national food security system**.

National food security system consists of two components **Buffer Stock and Public Distribution System** (PDS). The **primary objective** of **India's food security policy** is to ensure **availability of food grains** to

common people at an **affordable price**. The focus of this policy is on growth in agricultural production and on fixing the support price for procurement of wheat and rice to maintain their stocks. **Food Corporation of India (FCI)** is responsible for procuring and stocking food grains. The FCI procures food grains from the farmers at the government announced minimum support price.

5.1 Quantitative dimension of food security

India gained self-sufficiency in the food grains in 1970s mainly because of green revolution and has sustained it since then. The production of Foodgrains in the country is estimated at **315.72 million tonnes** which is higher by 4.98 million tonnes than the production of foodgrain during 2020-21 as per the **fourth advance estimates of production of major agricultural crops for the year 2021-22**, released by the Ministry of Agriculture and Farmers Welfare. Thus, in terms of per capita food requirements, India is self-sufficient in the production of major food crops like wheat and rice.

5.2 Qualitative dimension of food security

While the per capita food availability is sufficient, **food is not equally distributed**. Due to anomalies in the distribution channels and disproportionate purchasing power capacity of people, the nutritional requirements of vulnerable sections are not adequately addressed. **The Global Hunger Index 2021 report** has placed **India at 101st position** among 116 countries, much behind Bangladesh, Pakistan and Nepal. Hence the government came up with National Food Security Act in 2013 to address the food security issue at large.

5.3 National Food Security Act, 2013

It marks a paradigm shift in approach to food security – **from a welfare to rights-based approach**. The Act legally entitles up to **75% of the rural population and 50% of the urban population** to receive subsidized food grains under Targeted Public Distribution System. About **67% of the total population** therefore is covered under the Act to receive highly subsidized food grains.

The Act seeks to provide food and nutritional security in human life cycle approach, **by ensuring access to adequate quantity of quality food at affordable prices to people to live a life with dignity** and for matter connected therewith or incidental to it. The Act brings the **Right to Food** within the framework of legally mandated entitlements.

Key Features of the Act

- It entitles 75% of the rural population and 50% of the urban population (67% of the population i.e., 80 crore people) for subsidized grain under TPDS (Targeted public distribution system).
- The act provides '**individual entitlement'** and each individual will be provided **5 kg of wheat, rice or coarse cereals** a month at the rate of Rs 3, Rs 2, and Re 1 per kg respectively. These Prices may be changed by the Central Government from time to time, but after 3 years of the act only.
- 2.43 crore people under AAY (Antyodaya Anna Yojana) will get **35 kg food grain per household per month**.
- There is a special focus on **nutritional support to pregnant women** and **lactating mothers** and **children up to 14 years of age** by entitling them to nutritious meals. Pregnant women will also be entitled to receive **cash maternity benefit of Rs. 6,000** in order to partly compensate her for the wage loss during the period of pregnancy and also to supplement nutrition.
- The act contains an important provision for **women empowerment** by giving status **of head of the household to the eldest woman of the household**, for the purpose of issuing of ration cards.
- **State Governments** have been given responsibilities to identify the households within 365 days of the passage of the act.
- For children below 6 months, exclusive breast feeding is to be promoted. For children between 6 months to 6 years, age-appropriate free meals will be provided by the aanganwadi Centres. For children between **6-14 years of age (unto Class VIII)** will be given **Mid-Day Meal at public schools**.

- Every pregnant and lactating mother will get free meal at local aanganwadi (till 6 months of delivery) and a maternity benefit of Rs 6000 in instalments.

5.4 Steps taken to ensure food security

To tackle the quantitative and qualitative aspect of food security problem, India provides **three food-based safety nets and one monitoring programme**.

- Public Distribution System (PDS)
- Integrated Child Development Scheme (ICDS)
- Mid-Day Meals Program (MDM)
- National Nutrition Mission (POSHAN ABHIYAAN) – **Monitoring program**.

6 Issues in Indian agriculture

6.1 Agricultural land at risk

At 169.6 million hectares, India's cultivated landmass is the largest in the world. But the Government of India's top research institute reports that nearly 60% of agricultural land is at risk because of fertilizer misuse, poor cropping practices and soil nutrient deficiencies.

6.2 Poor utilization of water resources

India uses 13% of the world's extracted water and 87% used for irrigation. Irrigation water use efficiency is very low. 35-40% efficiency in surface irrigation such as flooding or canals, and 65-75% efficiency when pumping groundwater. These unsustainable practices are depleting the country's aquifers. One of the recommendations of the M.S. Swaminathan Committee was to reform irrigation resources and its distribution among farmers. The commission also suggested the use of rainwater harvesting, water level recharging to increase water supply.

6.3 Unemployment among agricultural workers

Around 55% of the population is engaged in agricultural production. As farms are divided among family members, average farm size today is half what it was 40 years ago.

6.4 Falling Investment in Agriculture

The Gross Capital Formation (GCF) in agriculture as a percentage of the total GCF in the economy has fallen from 8.5 % in Financial Year 2011-12 to 6.5% in Financial Year 2018-19. The Gross Capital Formation in the agricultural sector relative to the GVA in the sector is showing a fluctuating trend in sync with the variation in private sector investments, whereas the public sector investments have remained stable at 2-3 per cent over the years. This is because the share of private investment has shrunk.

6.5 Subsidy and Related Issues

Government subsidies to farmers for fertilizer, electricity and irrigation increased multifold over the years. Areas receiving the highest subsidies regularly underperform those with lower subsidies. Government subsidies for buying and distributing food grains to low income and disadvantaged households grew crowding out investments in agricultural education, research, technology and extension.

6.6 Harvest and post-harvest losses

Approximately 20–35% of the production is being wasted due to a lack of proper postharvest management.

6.7 Minimum Support Price (MSP) and Related Issues

- ***Selective Procurement*:** The government declares MSP for 23 crops, only wheat and paddy (rice) are procured in large quantities as they are required to meet the requirement of the Public Distribution System (PDS).

- ***Stagnant Rates of MSP:*** The government declaration of Minimum support prices do not increase at par with increase in cost of production.
- ***Unequal Access:*** The benefits of this scheme do not reach all farmers and for all crops. There are many regions of the country like the north-eastern region where the implementation is too weak.
- ***Non-Scientific Practices:*** MSP leads to non-scientific agricultural practices whereby the soil, water is stressed to an extent of degrading ground water table and salinization of soil.

6.8 Land Size

- ***Decreasing Area***: Area under agriculture has been shrinking, it reduced from 159.5 million hectares (mn ha) in 2010-11 to 157 mn ha in 2015-16.
- ***Increase in Land Holdings***: The number of operational holdings has been rising (increased from 138.3 million to about 146 million) owing to increasing population. This leads to falling average landholdings' size of farmers, which has come down from 1.2 ha to about 1.08 ha.
- ***Forced Selling***: Smaller landholdings produce smaller pockets of produce, aggregation of which becomes essential for even a trolley-load to be carried to an Agricultural Produce Market Committee mandi or a nearby market. Due to small holdings caused by fragmentation, small and marginal farmers are forced to sell their produce at the farm gate itself. This is especially so in states that have a weak network of APMC mandis.
- ***No Access to Modern Technology***: Bringing new technologies and practices to such a large number of smallholders scattered over a vast countryside and integrating them with the modern input and output markets is a huge challenge for Indian agriculture.

6.9 Low crop yields

The government has set the foodgrain production target at a record level of **328 million tonnes for the 2022-23 crop year** on the back of good monsoon rains. Production of food grains has seen a rise over the last few years with India being the largest producer of pulses and the third largest producer of cereals in the world. Likewise, yield of food grains has increased as well; however, it lags when compared with other agrarian economies. For instance, India accounted for around 24 percent of the world pulses production. While in terms of yield (664 kg/hectare) it was lowest among the top 10 countries, well below the global average (1009 kg/hectare). The case is the same for other crops as well. India, despite being the second-largest producer of paddy and wheat after China, reports low yield compared to other countries and below the world average.

6.10 Dependence on monsoon

Reliance on seasonal rainfall hampers productivity. Additionally, change in climatic conditions and erratic weather patterns such as cyclones and droughts can impact yields of agricultural crops. The growth of India's agriculture sector has been dependent on monsoons, and as a result, it has been volatile.

6.11 Low share in global markets

Another positive development amidst the pandemic for the sector has been an uptick in exports of agriculture commodities between March and September. Overall, while India has emerged as an agri-exporter nation with regards to crops such as rice, spices, tea, sugar etc., the share of India's agricultural exports in world trade remains low. The share of agri-exports to the country's total merchandise exports needs to improve as well. It has remained in the range of 12 to 15 percent on an average over the last five years.

6.12 Indebtedness and farmer suicides

The average monthly income of an Indian agriculture household was estimated at Rs 6,426, with a wide-spread disparity across states, ranging from Rs 18,059 in Punjab to Rs 3,558 in Bihar. About 52 percent of agricultural households in India are indebted. Nearly 64 percent of the marginal farmers (holding land less

than one hectare) or agricultural households are indebted, followed by small (1 to 2 hectares) agricultural households (18 percent). As many as 10,000 suicides were reported in the farming sector in recent years, of which 58 percent were farmers/cultivators and remaining were agricultural. Over 86 percent of agricultural land-holdings belong to the marginal and small farmers, according to the **Agriculture Census 2015-16.**

6.13 Poor Linkage with Industrial Sector

Indian agriculture in most parts of the country has a very limited forward linkage with other activities. The links between agriculture and industry in terms of labour and material inputs are still very weak. The existing links are to provide raw materials for agro-based industries and a provider of raw materials to the industrial sector.

7 Impact

7.1 Low income for farmers

The above factors have resulted in low income for farmers which is evident from the incidence of poverty among farm households.

7.2 Less Farm investments

The low and highly fluctuating farm income is causing a detrimental effect on the interest in farming and farm investments and is also forcing more and more cultivators, particularly younger age group, to leave farming.

7.3 Farmer Suicides

The country also witnessed a sharp increase in the number of farmers suicides in the last decades. For instance, major farmers suicide has been noted from Maharashtra, Chhattisgarh etc.

7.4 Food Security

This can cause an adverse effect on the future of food security and the state of agriculture in the country.

8 Steps taken to Increase Agricultural Production in India

8.1 Technological Measures

Measures are taken to increase agricultural production substantially to meet the growing needs of the population and also to provide a base for industrial development including steps to increase both extensive cultivation and intensive cultivation. The Green Revolution based on the use of package technology and the White Revolution (Operation flood) were some of the strategies initiated to improve Indian agriculture

8.2 Land reforms

Land reform measures are taken to abolish intermediatory interests in land (viz. Zamindars, jaghirdars' etc.) and transfer of land to actual tiller of the soil were expected to be taken up on a priority basis. Measures taken are:

- Abolition of intermediaries,
- Tenancy reform to:
  A. regulate rents paid by tenants to landlord
  B. provide security of tenure to tenants
  C. confer ownership rights on tenants and

- Imposition of ceiling on holdings in a bid to procure land for distribution among landless labourers and marginal farmers. These land reform measures are taken to irradiate the parasitic class of Zamindars.

8.3 Cooperation and consolidation of holdings

To prevent fragmentation of holdings, Indian agricultural policy introduced the programmes of cooperation and consolidation of holdings. Latter programmes aimed at consolidating plots owned by a particular farmer in different places of village by sanctioning land at one place of equal area or value to his plot of land. This avoids wastage of time and energy employed in cultivation and he can practise scientific technique of production. Cooperation aims at uniting small and marginal farmers together to reap the harvest of large-scale farming. Under cooperative farming small and middle-class farmers use their land and resources and practise joint cultivation.

8.4 Institutional credit

Another important measure was expansion of institutional credits to farmers through cooperative and commercial banks. After nationalisation of banks in 1969, nationalised banks have paid increasing attention to the needs of agriculture. Regional Rural Banks were also set up to deal specially, with the needs of agricultural credit. A National Bank for Agriculture and Rural Development (NABARD) was also set up. As a result, credit facilities were available to the farmers, the importance of money lenders has declined and exploitation of farmers at the hands of moneylenders is reduced. This was also recommended by the M.S. Swaminathan Committee (National Commission on Farmers).

8.5 Procurement and support prices

Announcement of procurement of support prices to ensure fair returns to the farmers so that even in years of surplus the prices do not tumble down and farmers do not suffer loss. In fact, the policy of the commission for agricultural cost and price in recent years has been to announce fairly high prices in a bid to provide incentive to farmers to expand production.

8.6 Input subsidies to agriculture

The government has provided massive subsidies to farmers on agricultural inputs like irrigation, fertilizers and power. The objectives of input subsidisation are to increase agricultural production and productivity by encouraging the use of modern inputs in agriculture. Under this policy various inputs are given to the farmers at a subsidised rate.

8.7 Rural Employment Programmes

To provide purchasing power to the poor, rural employment the programmes are needed. Government introduced poverty alleviation programmes from the Fourth Plan onwards like Small Farmers Development Agency (SFDA), Marginal Farmers and Agricultural Labour Development Agency (MFAL), National Rural Employment Programme (NREP), Rural Landless: Employment Guarantee Programme (RLECP) Jawahar Rozgar Yojana (JRY), Sampoorna Grameen Rozgar Yojana (SCRY) etc.

8.8 Doubling farmers' income by 2022-23

It is central to promote farmers welfare, reduce agrarian distress and bring parity between the income of farmers and those working in non-agricultural professions.

8.9 Priority Sector Lending (PSL)

Agriculture is a major component of **Priority Sector Lending (PSL)**, and the target for bank lending to agriculture has been revised upwards every year.

9 Important Schemes initiated by the government

9.1 Pradhan Mantri Krishi Sinchayee Yojana

- To achieve convergence of investments in irrigation at the field level.
- To enhance the recharge of aquifers and introduce sustainable water conservation practices.

9.2 Rashtriya Krishi Vikas Yojana – RAFTAAR (RKVY-RAFTAAR)

- To make farming a remunerative economic activity through strengthening the farmer's efforts, risk mitigation and promoting agribusiness entrepreneurship.

9.3 National Food Security Mission

- Increasing production of rice, wheat, pulses, coarse cereals and commercial crops through area expansion and productivity enhancement in a sustainable manner.
- Restore soil fertility and productivity at the individual farm level.

9.4 Soil Health Card Scheme

- To issue soil health cards every 3 years, to all farmers of the country, so as to provide a basis to address nutrient deficiencies in fertilization practices.

9.5 PM Fasal Bima Yojana

- To provide insurance coverage and financial support to the farmers in the event of natural calamities, pests & diseases.
- To stabilise the income of farmers to ensure their continuance in farming.

9.6 National Agricultural Market (NAM)

- To promote genuine price discovery
- Increases farmers' options for sale and access to market
- Liberal licensing of traders / buyers and commission agents. One license for a trader valid across all markets in the State

9.7 Pradhan Mantri Annadata Aay SanraksHan Abhiyan (PM-AASHA)

- The Scheme is aimed at ensuring remunerative prices to the farmers for their produce as announced in the Union Budget for 2018.
- It is expected that the increase in MSP will be translated to farmers' income by way of robust procurement mechanism in coordination with the State Governments.

9.8 Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)

- To provide income support to all farmer families having cultivable land.
- To supplement the financial needs of the farmers in procuring various inputs to ensure proper crop health and appropriate yields, commensurate with the anticipated farm income.

10 Measures to be taken for Sustainable Agriculture

10.1 Addressing Subsidies Problem

- ***Freeing up input prices to market levels***, or charging an optimum cost pricing for fertilisers, power, agri-credit, and canal waters fees.
- Channelizing the resulting savings for expenditures on investments in agricultural R&D, irrigation, marketing infrastructure, building value chains by involving **Farmer Producer Organisations (FPOs)** and linking farms to organised retail, food processing, and export markets.
- Direct income transfers to farmers should be promoted by leveraging the trinity of **Jan Dhan–Aadhaar–Mobile (JAM) to reduce the leakages and pilferage.**

10.2 Allowing Land Leasing

- As recommended by M.S. Swaminathan committee, the central government, in association with the state governments, should free up **land lease markets,** which can help provide farmers with a steady income, while maintaining asset security. In remote dry areas, leasing land to solar or wind power companies could provide farmers with relatively higher and steadier incomes.
- **The Model Land Lease Act, 2016** offers an appropriate template for the states and UTs to draft their own piece of legislations, in consonance with the local requirements and adopt an enabling Act.

10.3 Increasing Avenues for Non-Farm Income

- Subsidised electricity should be rationalised, as today **solar water pumps** are operationally and financially sustainable.
- This will reduce government burden of electricity subsidies, while at the same time allowing **surplus power from the solar powered pumps to be sold back to the grid.**
- **Promoting value-added uses of biomass** like Bamboo for construction and other applications, rice husk and bagasse-based mini-power plants, and ethanol from sugar cane and corn can all help augment farmer incomes in sustainable ways while developing more dynamic local rural economies.

10.4 Improving Agricultural Export Scenario

- India needs to **address the composition of its agriculture export basket.** Currently agricultural exports constitute 10% of the country's exports, but the majority of its exports are low value, raw or semi-processed, and marketed in bulk.
- The share of India's high value and value-added agriculture produce is less than 15%.
- Robust agriculture exports will increase the demand for India's farm output (and hence, incomes of farmers).
- In this context, the government has launched **Agriculture Export Policy 2018**. It is aimed at doubling the agricultural exports and integrating Indian farmers and agricultural products with the global value chains. Effective implementation and political will are the need of the hour.

10.5 Investing in Agriculture Infrastructure

- The most sustainable way to augment farmers' real incomes over the long term is **through investments in productivity-enhancing areas, ranging from agricultural research and development (R&D), to irrigation to the development of rural and marketing infrastructure.**
- **Local level investments** that seek to build village level storage facilities, better surface irrigation management, and investments in drip irrigation, tile drainage, trap crops, etc, that can give results in a relatively short period of time.

10.6 Agricultural Marketing Reforms

- Farmers' income can improve substantially if they are able to capture a greater share in the supply chain from farm gate to consumer.
- For this to happen, farmers must have the freedom to sell what they want, where they want, and when they want without any restrictions on sale, stocking, movement, and export of farm produce.
- These will require legal and institutional changes, major investments in market infrastructure and storage (including cold-chain storage), and incentives for the creation and operation of infrastructure by FPOs.
- In this context, the state needs to adopt **Model Agriculture Produce and Livestock Marketing Act, 2017**.

10.7 Need For Cooperative Federalism

- Agriculture is a state subject and many of the important levers—water, power, irrigation, extension, etc—are controlled by the states. However, the central government continues to play a larger role.

- Thus, reforms can only succeed if the central and state governments work closely together in a spirit of "cooperative federalism."

10.8 Improvements in allied sectors

Many small farmers cannot leave agriculture because of a lack of opportunities in the non-farm sector. Hence, allied sectors like horticulture, food processing, poultry etc needs to be pushed. For instance, government initiative like Project CHAMAN, AGRI-UDAAN programme, Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters (SAMPADA) etc. are notable.

10.9 Cooperative Farming

As recommended by the M.S. Swaminathan Committee, consolidation of land holdings also becomes important to raise farmer incomes. Farmers can voluntarily come together and pool land to gain the benefits of size. Through consolidation, farmers can reap the economies of scale both in input procurement and output marketing.

10.10 Diversification

There is a need to make a shift from rice and wheat-centric policies to millet, pulses, fruits, vegetables, livestock and fish.

10.11 Unified National Market

The creation of a competitive, stable and unified national market is needed for farmers to get better prices. National Agricultural Market (NAM) was launched in 2016. It needs to be more strenghthened.

10.12 Efforts for doubling farmers income

The quantitative framework for **doubling farmers income** has the following seven sources of growth increase in productivity of crops, increase in production of livestock, improvement in the efficiency of input use (cost saving), increase in crop intensity, diversification towards high-value crops, improved price realization by farmers, the shift of cultivators to non-farm jobs etc.

10.13 Innovations

The **major innovations** in production technologies that can significantly **impact overall productivity** and **production** in India include:

- ***Climate resilient seeds*** - The Indian Council of Agricultural Research (ICAR) has introduced climate-smart rice varieties – CR Dhan 801 and 802. These varieties, which have greater tolerance to submergence as well as drought, are a first for rice research and are unique globally. There is lot of ongoing research on seed varieties that are resistant to drought and submergence. The farmers just need to be incentivised to use such seeds and adopt climate smart farming practices such as changing sowing and harvesting timings, cropping patterns and inter-cropping.
- ***Protected and sustainable agriculture*** - Intensified agriculture with high input and high output has resulted in huge stresses on limited natural resources and the rural environment. In India, technologies to address this issue include micro-irrigation, solar pumps, neem coating of urea and soil health cards. Neem coating of urea, which is said to increase nutrient efficiency by 10 percent, has reduced the quantity of urea required by crops. In addition, unfolding innovations in farming practices such as soil-less farming systems – hydroponics, aeroponics, aquaponics and poly-house farming systems – need to be evaluated before being scaled up.

10.14 Incentives

- ***Direct income/cash transfer*** **-** Given the extensive leakages and inefficiencies involved in input subsidies, along with their low impact on poverty alleviation and growth, it is important to shift the priority from subsidies to investment as well as supporting farmers in a more predictable and structured manner. This points to income-support measures, which are less distorting and directly reach the real beneficiaries.

- ***Incentive for water and energy conservation*** **-** Both the Central and state governments have introduced different incentives for farmers to save water and use solar technology. A crucial step in this direction has been the introduction of the Pradhan Mantri Krishi Sinchai Yojana in 2015-16 and popularising micro-irrigation to ensure 'per drop, more crop'. The scheme is a step in the right direction towards promoting efficient water and electricity use. But whether or not it is scalable is a matter of further research.

11 Unresolved Issues

11.1 Changing Climate Affecting Agriculture

- **Extreme heat:** Crops need suitable soil, water, sunlight, and heat to grow. However, extreme heat events and reductions in precipitation and water availability have hampered the crop productivity.
- **Changing Rainfall Patterns:** Rainfall patterns have already begun shifting across the country, and such changes are expected to intensify over the coming years. This is likely to mean more intense periods of heavy rain and longer dry periods, even within the same regions.
- **Floods:** Flooding in many agricultural regions of the country have been witnessed and these floods have devastated crops and livestock, accelerated soil erosion and have polluted water.

Measures that can be taken

- **Low External Input Systems:** Moving our current agricultural production systems from an input-intensive regime to low external input systems requires engaging with farmers to first demonstrate alternate practices and then convincing them to change their practices. Concepts such as **Low External Input Sustainable Agriculture (LEISA)** are receiving increased attention as a sustainable alternative to chemical farming.
- **Zero Budget Natural Farming (ZBNF)**: It encourages farmers to use low-cost locally sourced input and should be promoted to minimise the use of chemical fertilisers and pesticides.
- **Small and Marginal Farmers:** They should be persuaded to shift to alternate packages of practices, demonstrated the effectiveness of these practices and encouraged to work in collaboration with the Krishi Vigyan Kendras to increase the outreach. For example, Cotton farmers in Maharashtra's Yavatmal district are making the shift to a package of practices that lower the use of water (through in-situ soil moisture conservation and other demand management measures), promote the use of biofertilizers and biopesticides as a means to reduce the cost of cultivation and lower the environmental footprint of cotton cultivation.
- **Multiple stress tolerant varieties:** Developing varieties tolerant to multiple abiotic and biotic stresses using stress-tolerant QTLs, genes and alleles in elite cultivars, is an efficient way of achieving climate resilience with easy access to farmers. ICAR developed crop varieties such as CR Dhan 801 and CR Dhan 802 for rice and several others for other crops, which are tolerant to multiple stresses i.e., submergence, salinity, drought, heat, pests and diseases.
- **Conservation agriculture:** Conservation agriculture helps to reduce the carbon footprint of the production system, improves productivity and enhances adaptability by modulating soil moisture and temperature regimes. Such practices are followed by farmers on a large scale in the Indo-Gangetic Plains. However, refinement and promotion are required to extend the technology in climatic stressed, dry land areas.
- **Mechanisation in agriculture with renewable energy sources:** Solar-powered machineries such as water pumps, sprayers and weeders are better alternatives to diesel powered machines in India. Such machines are economical, help in timely field operation at low cost, affordable to small farmers, and do not release greenhouse gases. Individual farmers, panchayats, cooperatives, farmer producer organisations can install solar power plants for which government is providing incentives.

11.2 Farmers' Suicides

India is an agrarian country with around 70% of its people depending directly or indirectly upon agriculture. But farmers' suicides in India is worrying. Farmer suicides account for approximately 10% of all suicides in India. There is no denying that the menace of farmer's suicides exists and runs counter to the aspirations of reaping benefits of our demographic dividend.

Facts

- Seven states account for 87.5% of total suicides in the farming sector in the country. The states are Maharashtra, Karnataka, Telangana, Madhya Pradesh, Chhattisgarh, Andhra Pradesh and Tamil Nadu.
- Both marginal farmers and small farmers are committing suicide.
- Ironically, Punjab, which benefited most from the Green Revolution, also presents a depressing picture of farmer's suicides in India.

Causes

- **The surge in input costs:** A major cause of the farmers' suicides in India has been the increasing burden on the farmers due to inflated prices of agricultural inputs. The culmination of these factors is seen in the overall increase in the cost of cultivation.
- **Cost of chemicals and seeds:** Be it the fertilisers, crop protection chemicals or even the seeds for cultivation, farming has become expensive for the already indebted farmers.
- **Costs of Agricultural equipment:** The input costs, moreover, aren't limited to the basic raw materials. Using agricultural equipment and machinery like tractors, submersible pumps etc adds to the already surging costs. Besides, these secondary inputs have themselves become less affordable for the small and marginal farmers.
- **Labour costs:** Likewise, hiring labourers and animals is getting costlier too. While this may reflect an improvement in the socio-economic status of the labourers, driven primarily by MGNERGA and hike in minimum basic income, this has not gone too well with boosting the agriculture sector.
- **Distressed due to loans:** NCRB data points out that in 80% of the studied cases in which suicide was committed, the victims had unpaid loans from local banks. This is clear enough an indication for drawing correlations between the two. Whether or not the banks had been harassing them, however, is a long-drawn debate and needs more specific empirical evidence.
- **Lack of direct integration with the market:** Although initiatives like the National Agricultural Market and contract farming are helping integrate the farmers' produce directly with the market, cutting the role of intermediaries, the reality is still lagging behind.
- **Lack of awareness:** The digital divide, as well as the literacy gap, has made the marginal and small farmers particularly vulnerable due to their inability to utilise the positives of government policies. This is reflected in the continued unsustainable cropping practices – like cultivating sugarcane in water-deficit regions.
- **Water crisis:** The concentration of these suicides in the water-deficit regions of states like Maharashtra, Karnataka is a manifestation of how the water crisis and thereby failure to meet production demands have intensified the menace. This is particularly true in the backdrop of continued failed monsoons.
- **Interstate water disputes:** What has added to the already prevalent crisis is the unwillingness to cater to each other's water needs amongst the states. A case in point is the recently resurfaced Kaveri dispute that saw Karnataka and Tamil Nadu battle out water shortage both in and outside the tribunal even to the extent of non-compliance with the tribunal award.
- **Climate change** has acted as the last nail in the coffin by resulting in furthering of the uncertainties associated with the already uncertain monsoon system and hence agricultural production. While incidents like flash floods have led to crop losses, deferred monsoons have seen production shortfall year-in and year-out.

- **India's urban consumer-driven economic policies:** The political economy of India is driven more by urban consumers than rural producers. This is reflected in the urgency to impose price controls in case of price rise (imposing Minimum Export Prices, bringing items under Essential Commodities etc) and a lacklustre withdrawal once the price is under control. Contrast this with how we have been imposing a minimum import price to secure our steel sector. This differential treatment to primary sector also limits profit margin and thereby hinders farmers' chances of breaking free from the cycle of indebtedness.
- **Loan waivers instead of restructuring, re-investment measures:** Our approach of handling farmer indebtedness and hence farmer suicides have been appeasement politics like the recent move by the UP government to waive off Rs 36000 crore worth of loans. Surprisingly this comes at a time when the agricultural yield is expected to be better in the wake of a good monsoon.
- In essence, the factors sum up to crop failure, unsustainable production and subsequent farmer indebtedness leading to failure of strengthening the economic state of the farmer as the driving force behind these suicides.

Way Ahead

- **Lower fertilizer costs** – Helping fertiliser industries cut down on costs, through internal funding rather than external borrowing should lower the input costs.
- Leveraging advancements in Science and Technology by ensuring that state seed policies focus on new genotypes, contract farming and sensitization to adverse weather conditions.
- **Precision farming techniques** like **SRI** (Systematic Rice Intensification) must be encouraged.
- Farm equipment policy must focus on imported equipment to provide for cheaper local manufacture, some incentives like grant of duty credit scrips may be tried.
- Subsidies must be rerouted towards capital generation and entrepreneurial Custom Hiring Centers (CHCs) and the implementation must be ensured in a timely fashion.
- **Corporate Social Responsibility (CSR)** must be encouraged in the agricultural sector, particularly towards capacity-building, skill development and the establishment of CHCs.
- **Institutional financing** must also be ensured to be adequate and inclusive rather than catering to the elites within the farming community.
- **Cooperative farming** must be promoted amongst small and marginal farmers to ensure that they are not left lurking while the big farmers reap the benefit at their cost.
- **Doubling the farmer income** by 2022 is a healthy aim, but loan waivers can't be the answer. Instead, sustainable agriculture that thrives on re-investment & restructuring is the way ahead. The role that the state has been playing is one of emancipation, but what the primary sector and the farmer needs is empowerment.
- **Direct interventions:**
  - Early-warning signals for unsustainable loans to launch a 2-pronged approach catering to both the burdened farmers as well as stressed banks.
  - Options for restructuring loans must be used wherever possible.
  - Insurance claim settlements must be speedy and just.
  - District wise list of indebted farmers and efforts in de-stressing them through counselling and other alternative mechanisms should be tried.
  - NABARD and local administration must take control of the situation and play a greater role in curbing farmers' suicides.
- Innovative efforts like Crowdfunding can be employed through the involvement of Civil Society Organizations (CSOs).
- Efforts like Agro-Climatic zoning, education through DD Kisan, Soil Health Card Scheme, various crop insurance and facilitative schemes like PM Krishi Sinchayi Yojana will go a long way in helping out.
- **Community-led** awareness must be taken employing a role model approach highlighting progress of farmers who have benefited from sustainable & climate-tailored agricultural practices

11.3 Farm Loan Waiver

Loan waivers, originally intended for a one-time settlement. However, the past two decades have seen such schemes announced with increasing regularity, signalling the chronic distress of the agricultural sector in India. Though these demands seem more legitimate in the wake of the loss of livelihood due to **lockdown amid Covid-19**, yet such loan waivers may prove detrimental to the banking system and credit culture.

Rationale for Loan Waiver

- More than 85% of small and marginal farmers in India possess less than 1-2 hectares of holdings and lack basic inputs for farming.
- In this context, the credit is a critical resource to farming households for carrying out crop production and meeting consumption & daily-life expenses.
- However, in India, the crop yield and production are highly dependent on monsoon. Farmers invest heavily in crops by taking loans. If the crop fails due to lack of rains or insufficient market demand, farmers will get trapped in debt. Due to this, there has been an increase in farmer suicides. Thereby, waiving farm loans address this humanitarian crisis.

Issues Related to Loan Waivers

- **Reputational Consequences:** Loan waiver schemes will disrupt credit discipline as farm loan waivers may act as a temporary solution and can prove to be a **moral hazard** in future. This is because those farmers who can afford to pay their loans might not pay it expecting a waiver.
- **Free Rider Problem:** Some farmers may take loans even if there is no need, in the hope of the next loan waiver scheme. This will impact the farmers who are genuinely in need of loans.
- **Decline in Formal Access to Credit:** After the implementation of debt waiver schemes and subsequent losses to the banking industry, banks will be reluctant to lend further to the farm sector. This leads to a rise in farmer's dependence on informal sector lenders. In other words, waivers lead to the shrinkage of a farmer's future access to formal sector credit and thereby compel them to depend on varying informal sources (like local moneylenders, Sahookaar) for credit.
- **Impact on Banking Sector:** A report by the Indian Council for Research on International Economic Relations stated that the farm-loan waiver led to three-fold increase in non-performing assets of commercial banks. This further affects credit-deposit ratio and risk-weighted capital adequacy ratio, return on assets and economic value of equity of banks. This downgrade the ratings of banks in particular and destabilizes the functioning of the credit market in general.
- **Against the Interests of Depositors:** Banks receive money from the depositors and lend money to borrowers under different contracts and agreements. Thus, the loss to the bank, due to loan waivers, is directly or indirectly against the interests of the depositors. Moreover, banks being custodians of depositors' money, need to be guided primarily by the protection of depositors' interests.

Way Ahead

In the present situation, farm loan waivers act only as a temporary solution to the problems of farmers and it will not make them free from issues like decreasing farm income, debt trap or crop failures. In this context, there is a need for creative engagement through which the surplus workers in the farming sector can be taken away to more productive sectors and farming can be made more profitable and sustainable for all the people.