VISION IAS

ECONOMY

PART 3

E-TECHNOLOGY IN THE AID OF FARMERS

Contents

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1. Introduction

Agriculture sector is crucial for providing livelihoods, ensuring food security and providing impetus to the growth of industries and service sectors. It is an **information intensive** sector that is **spatial** in nature. To be successful, farmers must be generalists who are not only well versed in the latest farming technologies but also astute businessman who are technologically savvy. Further, to cope with challenges posed by the globalization of agriculture, the farmers have to produce quality product at par with world market at reasonable prices. Thus, the farmers need to be well informed and well trained in the management of natural resources and production of agricultural commodities. Indian agriculture sector at present is facing **many challenges**, some of which are **following**:

> **Electronic-technology** (**E-technology**) is used as an overarching term incorporating all modes of transmission like electronic devices, satellite communication, mobile, services and applications which help to disseminate information with the help of technology.

- Increasing **productivity** of agriculture
- Ensuring **Remunerative prices** for farmers
- Making agriculture **sustainable** in the long run
- Ensuring consumers get **better produce at lower** prices (through reduced waste and more-efficient supply chain management)

> **E-agriculture** is a term to study the role of Information and Communication Technology in agricultural development. Simply speaking, it is a way of harnessing the power of ICT in agricultural domain.

E-agriculture and e-technology can play an important role in addressing these challenges and uplifting the livelihood of Indian farmers.

2. How can e-technology benefit farmers

E-technology can help agriculture sector, particularly in the following ways:

- **Improved decision making** by dissemination of **relevant and timely information** to farmers regarding:
  - agro-inputs such as on seeds, fertilizers, pesticides etc.
  - crop production, crop management, soil recommendations
  - weather forecasting and disaster preparedness
  - agro processing, market support and marketing of agriculture produce
  - agro-finance and management of farm agri-business
  - government schemes and steps to provide e-aid to farmers
  - localized information on specific subject around village/block/district/state
- For the purpose of **improving skills and productive capacities** of farmers, cost effectiveness, viability and sustainability.
- In the field of agricultural **research**, **extension** services and **technology** transfer.
- It can facilitate link with government agencies for **effective governance.**
- The **information** can be delivered in the form of text, SMS, email and audio/video in the **local language**.
- Farmers have been empowered to ask specific questions, exchange their opinions, experiences and ideas.
- To **compete** in complex, rapidly changing global markets (avoiding falling behind the technology curve).
- Experts opine that introduction of IT in agriculture can bring **another Green Revolution** in India with **easy and cost effective information** to the farmers at the right time.

3. Drivers of E-technology in Agriculture

Following main trends have been the key drivers of the use of e-technology in agriculture:

- low-cost and pervasive connectivity and adaptable and more affordable tools due to booming mobile, wireless, and Internet industries
- advances in data storage and exchange due to continuous research in IT sector
- innovative business models and partnerships with government and private sector collaborations
- the democratization of information, including the open access movement and social media

4. Schemes Related to E-technology to Aid Farmers

Governments and private sector have launched a number of e-technology initiatives to harness the potential of e-technology to tackle various challenges. Some of these initiatives are:

4.1. National e-Governance Plan in Agriculture (NeGP-A)

The Government is implementing a Centrally Sponsored Scheme **"National e-Governance Plan in Agriculture (NeGP-A)"** in the entire country. The Programme aims to achieve **rapid development of agriculture in India** through **ICT enabled multiple delivery channels such as Internet, Government Offices, Touch Screen Kiosks, Krishi Vigyan Kendras , Kisan Call Centres, Agri-Clinics, Common Service Centers, Mobile Phones (Broadcast, IVRS, interactive messaging using unstructured Supplementary Service Data and Voice Recognition** for ensuring timely access to agriculture related information for the farmers of the country. A number of applications in agriculture and allied sector have been developed under the project for providing integrated ICT based services to farmers.

4.2. Information Technology Vision 2020

The **National Agricultural Policy** lays emphasis on the use of Information Technology for achieving a more rapid development in India. Accordingly, the Department of Agriculture and Cooperation (DAC) has formulated information technology vision 2020. This **vision states** that:

- Information relating to agriculture sector would be available to the ultimate users–the farmers for optimizing their productivity and income.
- Extension and advisory services making use of information technology would be available to the farmers on round the clock basis.
- The tools for information technology will provide networking of agriculture sector not only in the country but also globally and the Union and State Government Departments will have reservoirs of data base and

Department of Agriculture & Cooperation has also developed more than 80 portals, applications and websites (primarily in collaboration with the National Informatics Centre) covering both the headquarters and its field offices/ directorates. The important portals include SEEDNET, DACNET, AGMARKNET (prices and arrivals in Mandis), ATMA.

4.3. Kisaan SMS Portal

Government of India, in 2013, developed an SMS Portal for Farmers for dissemination of relevant information, giving topical and seasonal advisories and providing services through SMSs in language of the state. It is an integrated Farmers' Portal developed completely in-house by Department of Agriculture and Cooperation.

The **main features** of the Kisaan SMS Portal include:

- The farmers can register to this portal by calling Kisaan Call Centre or through the web portal. The registration is free of cost. They can register their queries, about the weather report, soil type, prospects and problems of market and so on by using this SMS portal.
- The relevant information will be provided to farmers in their own or regional languages.
- The SMSs will get transmitted only to the farmers within the territorial jurisdiction of an officer, scientist or experts for the crop or agricultural practice that such a farmer might have opted for.
- The farmers will get the information, services and even some advisories through this portal. The content may include information about the schemes, advisories from the experts, markets.
- The officers can send SMS to the farmers belonging to the entire area of their jurisdiction or a part of it.
- This Portal will also integrate existing farmer database of the farmers.

Strengths

If the farmers are aware of this portal they can be benefited in different ways which are as follows:

- Crop advisory will lead to the adoption of more appropriate technologies suited to local condition. The farmers can choose the relevant techniques and technologies that they desire.
- Information on schemes and programmes of Government of India can help every farmer to reap benefit out of these schemes thus widening the footprint of these schemes.
- Weather always plays a crucial role so far as agriculture is concerned. On the onset of any adverse weather condition, advice can be provided to the farmers on effective resource to be adopted.
- Outbreak of the disease/pests can be controlled as advisories can be provided immediately to the farmers in and around the area of initial report of the disease/pest. Early treatment may minimise the damage.
- Selection of suitable and better variety/breed by the farmer based on the information/ advisory can provided to him/her.
- Soil test results in his mobile will help in selecting the right fertilizer and the dosage.
- This Portal is Cost effective. The farmers can get all the information through SMS after registering their details on the toll free number.
- Timely market information will give better bargaining power to the farmer.
- Weather forecast can help the farmer in planning farm operation effectively.

Threats

The major threats of the portal are as follows:

- There is no provision for self-generation of finances for the maintenance of the portal.
- Role of middle man (Because of the lack of education some framers hesitate to talk in the mobile phone and some middle man may create problems or disturbances.)
- The function of this portal is like one way information flow. The farmers will not receive any information until and unless he asked for the same.
- The mechanism of evaluation is lacking or unsystematic in this SMS Portal system.

Suggestions

In order to improve the activities and to make this portal a very effective one the following measures can be adopted:

- Farmers should be made aware of this portal.
- There should be a close link with the Panchayati Raj Institutions.
- The banking facilities should be included in this portal.
- There should be at least one facilitation centre in each village.
- There should be the provision of checking the fraud SMSs.

4.4. Agrimarket App

The mobile application has been developed as an **initiative under Digital India** with an aim to keep farmers abreast with the crop prices and discourage them to carry-out distress sale. Farmers can get information related to prices of crops in markets within 50km of their own device location using the AgriMarket Mobile App. This app automatically captures the location of the farmers using mobile GPS and fetches the market prices of crops which fall within the range of 50km. The prices of agri commodities are sourced from the Agmarknet portal. Currently, the apps is available in English and Hindi languages.

4.5. Crop Insurance Mobile App

Crop Insurance mobile app has been developed as an **initiative under Digital India** which can be used to calculate the Insurance Premium for notified crops based on area, coverage amount and loan amount in case of loanee farmer. It can also be used to get details of normal sum insured, extended sum insured, premium details and subsidy information of any notified crop in any notified area.

4.6. e-NAM

It is a **pan-India electronic trading portal**, which seeks to connect existing APMCs and other market yards to create a unified national market for agricultural commodities.

Expected Benefits

- Increase operational efficiency and transparency in the mandi operations
- Enhance market access and more options for farmers through warehouse based sales
- Larger national market for secondary trading for the local trader in the mandi
- Reduction in intermediation costs for bulk buyers, processors, exporters etc.
- Eliminate information asymmetry
- Will lead to common procedures for issue of licenses, levy of fee and movement of produce In 5-7 years, it will result into higher returns for farmers, lower transaction costs to buyers and stable prices and availability to consumers
- It will also help in emergence of value chains by promoting scientific storage and movement of agricultural goods

4.7. Seednet

Seednet India Portal is a National Initiative for information on Quality Seeds by Union Ministry of Agriculture and Farmers Welfare. Users can find information on seed sector in India, quality control, seed replacement rate, seed multiplication ratio, breeder seeds, foundation seeds, certified seeds, etc. Details related to Seed Bill 2004, seed varieties, seed bank, seed testing labs, seed dealers, test laboratories, certification agencies, etc. are also available.

4.8. DACNET

Department of Agriculture and Cooperation (DAC) Ministry of Agriculture launched a project called DACNET to take the benefit of information technology in services that it provides and improving its governance. DACNET has proved very useful in reducing the processing time for certain services provided by the department from more than one year earlier to less than three

months. DACNET's key criteria included ease-of-use, speed of information delivery, low incidence of errors, reduction in corruption, and affordable services.

4.9. AGMARKNET

AGMARKNET, (Agricultural Marketing Information Network) is a joint venture of the Directorate of Marketing and Inspection (DMI) and the National Informatics Center(NIC). Currently, it covers 2800 market nodes and 300 commodities and provides information in ten languages. It has increased the efficiency in marketing activities by establishing a nation-wide information network, which provides information on prices, arrivals, availability, trends, analysis, laws etc. These timely information data are helpful to producers, traders and consumers. It has been connected to 670 agricultural produce markets and 40 State Agricultural Marketing Boards and Directorates. Each AGMARK portal of wholesale market provides daily information to AGMARK portals of its respective states, and then each state's AGMARK portal sends the information to the AGMARKNET portal. The National Information System maintains all of these portals. The food processing units, traders and different village kiosks, to help the farmers in taking the right decisions mainly use these portals.

4.10. Kisan Call Centres (KCC)

"Kisan Call Centres (KCCs)", launched in 2004, is aimed at answering farmers queries on a telephone call in farmers own dialect. This Scheme provides agriculture related information to the farming community through toll free telephone lines. A countrywide common eleven digit number has been allotted for Kisan Call Centre. The number is accessible through all mobile phones and landlines of all telecom networks including private service providers. Replies to the farmers' queries are given in 22 local languages.

4.11. AGRISNET

Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India is implementing a Central Sector Plan Scheme "Strengthening/ Promoting Agricultural Informatics & Communications" of which one of the component is AGRISNET. The objective of AGRISNET is to provide improved services to the farming community through use of Information & Communication Technology(ICT).

4.12. Green SIM

This programme is implemented by IFFCO Kisan Sanchar Limited (IKSL). The features of IKSL services include delivering up to four free voice messages on areas of interest, and have a helpline services managed by experts and organize phone-in programmes and mobile-based quizzes. Farmers' queries are given in 22 local languages. The messages are delivered daily in regional languages and have content in 16 different categories which includes Agriculture, Horticulture, Animal Husbandry, Floriculture, Poultry, Irrigation, Fertilizers, Insurance, Banking, Rural Health and so on. To increase the access of information, IKSL have an online portal (voice, text and images) which can be accessed by anyone anytime and even on a mobile app.

4.13. Facebook for Farmers and Extension Workers

The social media platform such as Facebook is being effectively used in Kerala for reaching out to farmers and extension workers. Based on the success of using Facebook by the Vattamkulam Krishi Bhavan (Malappuram District, Kerala), the Government of Kerala has decided to officially include Facebook as an important tool to strengthen the extension activities of the Department of Agriculture. The state agriculture department has urged all the officials under it to extend the activities of the department through the social media to enhance the productivity and profitability of farming. All the farmers registered with the department will have to maintain a

social media account to be in touch with the local Krishi Bhavan. The government has mandated that all agricultural officers should have active Facebook accounts.

4.14. E-choupal

The e-Choupal initiative of ITC Ltd. to provide farmers the information they need to be more successful. This platform also enables buyers to come to the farmers instead of having to haul the produce to market, where oftentimes traders manipulate the market in order to exploit the farmers out of their proper earnings.

The initiative also provides access to storage services and agricultural equipment in addition to other important assets for rural farmers. The e-Choupal network has expanded to 6,500 centers synchronizing the efforts of 40,000 villages to produce greater quantities of better produce and profit.

4.15. SasyaSree

"SasyaSree – a One Stop Telugu portal for Information Dissemination" was initiated based on the identified need of having locally specific, demand driven knowledge solutions in local language through a web portal. The project caters to eight districts in Andhra Pradesh by documenting the best crop management practices, information related to Government schemes, market price and other information needs of the farming community in local language by means of video, audio, photographs etc. The project also tries to integrate with other public extension initiatives and provide information on other allied sectors such as animal husbandry, poultry etc.

4.16. mkrishi

Tata Consultancy Services (TCS), India's leading IT firm, offers personalized advisory services in voice and visual formats using communication devices such as mobile phones through its mKRISHI platform.

4.17. Weather based Information regarding natural calamities disseminated to farmers under different programmes.

- Weather based information on natural calamities like drought etc. is one of the identified services under **NeGP-A** pertains to "**Providing information on Forecasted Weather**" and aims at providing disaggregated District level information in each agro-ecological sub-region on forecasted weather and agro-met advisories through multiple service delivery channels to the farmers (including SMS) .
- Weather related advisory service to farmers under **Gramin Krishi Mausam Sewa** (GKMS) is being implemented by the Department of Agriculture, Government of Maharashtra and India Meteorological Department (IMD), Ministry of Earth Services (MoES), Govt. of India
- Development of **need based content** on weather information and advisories to farmers has been initiated by IMD, Department of Agriculture, Government of Maharashtra and GIZ, New Delhi under the project on "**Climate Change Knowledge Network – Indian Agriculture (CCKN-IA)**"
- Mahalanobis National Crop Forecast Centre (MNCFC) regularly (on monthly basis) carries out drought assessment at District/sub-district level using **satellite based remote sensing data, rainfall data and ground information** with respect to sowing progression, irrigation percentage, under the **National Agricultural Drought Assessment and Monitoring System** (NADAMS) programme etc. These assessments are communicated to concerned Departments in States including Maharashtra and are also available online on MNCFC website

- IMD in consultation with SAUs, State Department of Agriculture (including Maharashtra) carries out **monitoring of drought and other calamities** at district level based on the observed rainfall and other parameters like Aridity Index, Standardised Precipitation Index, NDVI etc.

5. Challenges in E-agriculture

- Lack of awareness and literacy among farmers about the use and benefits of e-agriculture.
- Lack of digital infrastructure which includes lack of accessibility and affordability to internet, mobile phones, and other ICT devices.
- Digital Divide also poses a challenge in adoption of e-agriculture.
- Even where farmers have access to mobile phones, they are reluctant to talk on phone themselves and may employ a middle man who can distort the communication.

6. Way Forward

Harnessing the full potential of e-agriculture will require the implementation of a complex set of policy, investment, innovation, and capacity-building measures, in concert with beneficiaries and other partners, which will encourage the growth of locally appropriate, affordable, and sustainable ICT infrastructure, tools, applications, and services for the rural economy. Some of the suggestions to accomplish these tasks are following:

Enhancing Rural Access

- Government should introduce and promote the concept of smart villages in the policy making as well as administration in order to make villages more techno-savvy and environmental sustainable.
- While investing in communication infrastructure the focus should be on financially viable and socially acceptable approaches that are accessible to the rural poor.
- The Government should, ensure low prices for broadband Internet in rural areas.
- Foster combined public private efforts and cost sharing arrangements to ensure sustainability of rural information centers.
- Foster awareness raising and capacity building of rural communities to use and maintain ICT.
- Foster the adoption of information into formats and languages relevant for rural areas. Investment is needed to repackage technical information for farmers and make it available in local languages.
- Existing channels for technical information (e.g., extension services, radio stations) should be integrated with new communication technologies, which are accessible to farmers.

Education and Generating Awareness

- Technological empowerment through pro-poor digital interventions needs to be carried out
- Agriculture should be introduced as a subject in school curriculum and computer education should be an important part of Agriculture Education System.
- Development of digital libraries in rural areas can play an immense role in providing adequate learning environment, imparting literacy to rural communities and in transfer of agricultural technologies to farmers
- In India, farmers are reluctant to move away from their traditional methods. They do not want to utilize the system, even if the cost incurred by them is very low. Thus, it is necessary to change the attitude and mindset of the farmers and make them aware of the benefits of ICT in agriculture.

Market chains

- The growth of communication networks needs to be supported amongst actors in the chain (farmers, transporters, buyers, traders, etc) in order to ensure more equitable, timely and collaborative access to markets for small holders.
- Government should put policies into place that systematically capture local knowledge, ensure appropriate research agenda setting and support the functioning of intermediary organizations.
- Government should aid the process of identification and vertical integration of diverse ICT tools that are employed in present day agricultural practices.

Research and Innovation

- Researchers and extensionists require continued training in how to interact and share knowledge more effectively using the new digital technologies.
- Academic and research data in agriculture, available in the form of journals and research paper needs to be digitalized to facilitate cross flow of information.
- At local and sub-national level, there should be institutional mechanism, mainly multi-stakeholder, to link rural communities with universities, research agencies through intermediary organizations.

7. Miscellaneous

7.1. Digital India Program

- The Digital India programme is a flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy.
- This programme has been envisaged by Department of Electronics and Information Technology (DeitY).
- Its **objective** is to transform India into a digitally empowered society and knowledge economy.
- Its **intended beneficiary** are citizens through improved IT infrastructure and service delivery

Salient Features of Digital India Programme

The Digital India programme is centred on **three key vision areas**:

- Digital Infrastructure as a Utility to Every Citizen
- Governance & Services on Demand
- Digital Empowerment of Citizens

It aims to provide the much needed thrust to the **nine pillars of growth areas**, namely:

- Broadband Highways,
- Universal Access to Mobile Connectivity,
- Public Internet Access Programme,
- e-Governance: Reforming Government through Technology,
- e-Kranti - Electronic Delivery of Services,
- Information for All, Electronics Manufacturing,
- IT for Jobs and
- Early Harvest Programmes.

Some of the **projects launched under the Digital India initiative**:

- **Digital locker system** to minimise usage of physical documents and enable their e-sharing via registered repositories.

- **MyGov.in** as an an online platform to engage citizens in governance through a "Discuss, Do and Disseminate" approach.
- **National Scholarship Portal** for beneficiaries from submission of application to verification, sanction and disbursal.
- **Bharat Net programe** as a high-speed digital highway to connect all 250,000 gram panchayats of country -- the world's largest rural broadband project using optical fibre.

8. Previous Years Vision IAS GS Mains Questions

1. Information Technology has a huge role to play in making agriculture a sustainable activity even for smallholder farmers by providing them with necessary information at every stage of farming at the right time. Discuss.

Approach:

The answer should cover all the aspects like improved decision making, better planning, community involvement, etc.

Answer:

Important roles played by information technology in agricultural activities are:

- By providing information about weather and climate, soil conditions, market prices and government policies, information technology can help farmers in making an informed choice regarding the crop to be grown.
- By providing information about the new scientific techniques, newer varieties of specific crops, methods of pest control, etc. information technology can help farmers in maximising their production.
- Information technology can be of great help in bringing different farmer groups and associated people together to discuss and find out the best ways to maximise agricultural production as well as income.
- Most importantly, information technology can provide farmers access to national as well as global markets through price dissemination systems like AGMARKNET and spot exchanges. Hence they can help farmers fetch the most remunerative price for their produce.

Based on the above points it is also clear that no single medium can fulfill the information needs of individual farmers. Hence it is necessary that a combination of group and individual sources of media like radio and mobiles is used to provide farmers all the information which can promote informed decision making by farmers.

2. E-technology has a crucial role in increasing the productivity of agriculture and allied activities in India. Explain. Bring out the major constraints in utilizing e-technology in the Indian agricultural sector.

Approach:

- Briefly write about the need of e-technology in agriculture.
- Explain the different ways e-technology can be used to increase the productivity in agriculture and allied activities in India.
- Bring out the major issues and problems in the implementation of e-technology in agriculture.
- Conclude with brief suggestions.

Answer:

In the context of agriculture, the potential of e-technology can be assessed broadly under two heads: as a tool for direct contribution to agricultural productivity; and as an indirect tool for empowering farmers to take informed and quality decisions which will have positive impact on the way agriculture and allied activities are conducted.

- Precision farming, popular in developed countries, extensively uses IT to make direct contribution to agricultural productivity.
- The techniques of remote sensing using satellite technologies, geographical information systems, agronomy and soil sciences are used to increase the agricultural output. This approach is capital intensive and useful where large tracts of land are involved. Consequently it is more suitable for farming taken up on corporate lines.
- The indirect benefits of IT in empowering Indian farmer are significant and remains to be exploited.
- The Indian farmer urgently requires timely and reliable sources of information inputs for taking decisions. At present, the farmer depends on trickling down of decision inputs from conventional sources which are slow and unreliable.
- The changing environment faced by Indian farmers makes information not merely useful, but necessary to remain competitive.

Various programmes have been initiated in this regard such as ITC e-choupal, Rice knowledge management portal, Village knowledge centres, Village resource centres, e-krishi, Mahindra Kisan Mitra etc.

Some of the major constraints in the implementation of e-technology in agriculture in India are:

- **Duplication of efforts:** It is observed that some initiatives have already been made to provide IT based services to rural community. However, duplication of efforts are witnessed as most of the services revolve around limited subjects.
- **Power Supply:** In most of the rural India, power supply is not available for long hours. This will reduce the usefulness of the intended services.
- **Connectivity:** Despite the phenomenal progress made in the recent years, the connectivity to rural areas still requires to be improved. Reliable connectivity is a prerequisite for a successful penetration of IT into rural areas.
- **Bandwidth:** Even in areas where telephone and other communication services exist, the available bandwidth is a major constraint. Since internet based rural services require substantial use of graphics, low bandwidth is one of the major limitations.
- **Restrictions:** government's map restriction policies often threaten to stifle the optimal utilisation of the tools of remote sensing and geographical information systems.
- **Lack of awareness and education:** The majority of farmer community is unaware of the benefits of e-technology. The present technologies are not user-friendly. The success of e-technology depends on the ease with which rural population can use the content.
- **Local languages:** Regional language fonts and mechanisms for synchronisation of the content provide a challenge that needs to be met with careful planning.

Rapid changes in the field of information technology make it possible to develop and disseminate required electronic services to rural India. The existing bottlenecks in undertaking the tasks need to be addressed immediately. A national strategy needs to be drawn for spearheading IT penetration to rural India.

3. Information and Communications Technology (ICT) has the potential to revitalise the agriculture sector in India. Discuss the initiative taken by the government in this regard along with highlighting the bottlenecks in its implementation. What measures are required to remove these bottlenecks?

Approach:

- First enumerate various digital initiatives by the government.
- In the second part discuss various bottlenecks in implementation of the same faced by the sector with certain suggestions by giving examples of how to tackle the problem.

Answer:

Various initiatives taken by government to make agriculture a tool for inclusive development with the use of ICT are:

- National Agricultural Market through Agri-Tech Infrastructure Fund, an online platform.
- Soil health card.
- TV channel DD KISAN.
- E-Mandi is an electronic market platform to sell the vegetables online at the best prices, for both the retailers and the whole sellers by providing a convenient way to keep the transparency in the whole marketing system.
- Free software by Department of Agriculture & Cooperation to the UTs and the States and there will be a subsidy by the Government of India up to Rs. 30 lakh per Mandi for their infrastructure. Reforms possible in PDS expansion of PDS coverage, computerization, etc.
- mKisan SMS Portal for farmers enables all Central and State government organizations in agriculture and allied sectors to give information/services/advisories to farmers by SMS in their language, preference of agricultural practices and location.
- Agriclinics to provide **expert** services and advice to farmers on **cropping practices**, technology dissemination, crop protection from pests & diseases, market trends and prices of various crops in the markets and also clinical services for animal health etc.
- Krishi vigyan kendras ***for*** training and education of farmers, entrepreneurs, farm women, rural youth, financial institutions extension functionaries as well as voluntary organizations.

Problems faced by the sector:

- Infrastructure problems like inadequate support of hardware for every village like PCs, internet connectio , printer, etc.
- Problem of continuous electricity supply to be connected to the internet.
- Inadequate trained professional to guide the village common farmer with usage of internet or other software programmes.
- Providing free software and subsidy for hardware components imposes huge financial burden on central government.

- Proper connectivity or expansion of telecom operators in rural areas.
- No adequate promotion to Research or social innovative products in rural backdrop.
- Lack of effective community participation and awareness nationwide.
- Problem of providing ICT facility in local language.

But all the above problems can be solved by successful completion of some projects and schemes like full electrification of all villages, national optical fiber network, off grid promotion to solar energy, feeder separation for consumers and agriculture, promotion of training to rural youths in computer, awareness programmes about the benefits of use of ICT, linking industry with agriculture to bring in use of technology, etc.

ICT can thus be leveraged for enhancing the capacity of the agriculture sector and improving and diversifying farm incomes.

9. Previous Years UPSC Mains Questions

1. How can the 'Digital India' programme help farmers to improve farm productivity and income? What steps has the Government taken in this regards?

INDIAN ECONOMY AND ISSUES RELATING TO MOBILIZATION OF RESOURCES

Contents

1. Introduction

Anything that has *utility* or *usability* is a resource. The government requires resources – human, physical and economic - to carry out its functions. In this document, we will deal only with economic resources. Mobilization of resources, in this context, means "**efficient collection and channelizing of resources**" to achieve some goal.

Ways of resource mobilization include direct or indirect taxes, import or export duties or fees for services, or borrowings.

2. Sources of Financial Resources of Government

There are three sources from where the government gets money. The first two are revenue sources, and the last one is borrowings and capital asset sales:

- **Tax Revenue –** This is the tax that the government collects in the form of personal income tax, goods and services tax etc.
- **Non Tax Revenue –** These are things like interests on bonds held, dividends from PSUs, and grants. They are revenue sources meaning they don't have to be repaid and are smaller than tax revenues.
- **Capital Receipts –** These are borrowings of the government like the market loans, short term borrowings, external commercial borrowings etc. The loans received from foreign governments and bodies, disinvestment receipts and recoveries of loans from State and Union Territory Governments and other parties are also part of capital receipts.

Some Estimates of Financial Resources Required

- India will need about **USD 4.5 trillion in the next 25 years** for infrastructure development. (Economic Survey 2018)
- Over the next decade, India requires over **USD 1.5 trillion** to fill up the infrastructure gap.
- Investment on infrastructure needs to increase to **INR 50 lakh crore over the next five fiscals** through 2022. (CRISIL)

3. Transfer of Resources from Center to States

In the federal system of India, state and local bodies depend a lot on Center for meeting their financial requirements. There exist several mechanisms to channel resources from Center to states, such as:

- Finance Commission to lay down principles which shall govern division of sharable pool of taxes of Union of India.
- Goods and Services Tax Council make the recommendation on rate of the GST, surcharges, Exemptions, Model of GST law, Place of Supply rules, and special rate of the GST, Special Provision for North east states or any other matter as decided by the council.
- Grants-in-Aid under Article 275 of the Constitution of India.
- Discretionary grants under Article 282.

Recent Changes Impacting Transfer of Resources

- With the **abolition of Planning Commission,** the model of grants tied to Five Year Plans (FYP) has been done away with (12th FYP which ended in 2017 was the last in series). The grants which were hitherto transferred through Planning Commission are now routed through Finance Ministry.
- **Goods and Services Tax (GST)** has subsumed a number of central and state indirect taxes and provided for a Goods and Services Council. But there has been criticism that it has led to an adverse effect on the fiscal position of the states. Accordingly, it has been provided that the Parliament may by law and with the recommendation of the GST Council, will provide compensation to the State on account of implementation of the GST.

- **Restructuring of Central Sponsored Schemes**: Starting from the FY 2016-17, the schemes of Centrally Sponsored Schemes (CSS) have been reduced drastically. The reduction in the number of schemes coupled with the increase in devolution of resources by the 14th Finance Commission reduces the dependency of States on the Centre. It also facilitates the State Governments in designing schemes as per their needs.

4. Issues in Mobilization of Resources

A. There exists **vertical imbalance** (between the Centre and the States) and **horizontal imbalance** (among the states with varying fiscal capacities) in the distribution of financial resources.

B. **Fiscal Consolidation** – against the background of continuing resource asymmetry, most States achieved the statutorily envisaged fiscal consolidation by 2006 itself. They brought down the fiscal deficit to less than 3 per cent of the GDP and wiped out the revenue deficit as mandated. But the Centre did not comply with the FRBM mandate and it has not been able to control its revenue expenditure.

C. **Low Tax-to GDP** ratio:- India's tax-to-GDP ratio for 2017-18 was 11.6% and is well below the emerging market economies and OECD averages of about 21% and 34% respectively. **Key reasons** for India's low tax-GDP ratio are:

- Structural factors such as low per capita income keep tax collections low.
- **Exemptions in the taxable income** have grown at a much faster rate than the income reducing tax buoyancy.
- A lack of policy initiatives has also kept the tax rate low such as *certain tax exemptions* to income generated by small and medium enterprises and agriculture related activities.
- **Widespread income tax evasion as evident by the fact that only 1.7% of the population paid income tax in 2015.-16.**
- **Inefficient tax administrative system, arbitrariness in deciding upon tax quantum of corporate, loopholes in Double Taxation Avoidance Agreement, multiple litigations involving corporate etc. have affected the revenue capacity.**

D. It is widely known that India's **subsidy system** is highly inefficient and millions of needy people do not get their quota of subsidy. Food, fertilizers and fuel (3Fs) are major components of the union's subsidy budget.

NITI Aayog on rationalizing subsidies:

- Social subsidies should be reoriented so that people become economically independent rather than perpetually dependent upon them.
- Within revenue expenditure, subsidies have crowded out more socially relevant expenditures like education and health.
- Better targeting through use of socio-economic and caste census data.
- Doing away with production subsidies like cheap lands and other benefits to companies.
- Use of DBT in all the social welfare distribution schemes.

E. **Increasing Tax Arrears to the tune of Rs. 5 lakh crores –** the Government should make a determined effort to recover the huge income tax arrears. The total arrears amount to be recovered is stuck because of a variety of reasons like litigation, companies in liquidation, sick companies and untraceable taxpayers.

F. **Corporate Tax Exemptions –** Despite having a scheduled corporate tax rate, which is comparable with developed countries, the effective tax rate for the private corporate sector in India continues to be low due to the myriad exemptions. The various tax exemptions that exist today needs to be rationalized.

5. Steps taken by the Government

- Doing away with plan and no-plan expenditure.
- Merger of General and Railways Budget.
- Restructuring of CSS.
- N K Singh panel was formed to review FRBMA for fiscal consolidation.
- Rationalization of subsidies through several initiatives:
  - Direct Benefit transfer scheme through Jan Dhan-Mobile-Aadhar trinity.
  - Shifting to Nutrient based subsidy scheme for fertilizers.
  - Doing away with fuel subsidies except LPG and Kerosene.
  - Freeing diesel and petrol prices.
  - Give-it-campaign for LPG subsidy and withdrawing LPG subsidy from consumers having taxable income of 10 lakhs or more
- **Levy of Long Term Capital Gains tax** in Budget-2018 announced on profit exceeding Rs. 1 lakh during the sale of shares (equities) & equity mutual funds.
- Review of Public Private Partnership projects (PPPs) through various initiatives:
  - Setting up robust institutional structure for appraising and approving PPP projects.
  - Developing standardised documents such as model concession agreements across infrastructure sectors.
  - Increasing availability of finance by creating dedicated institutions and providing viability gap funding.
  - Abolishing of FPIB as more than 90% of FDI inflows are routed through the automatic route which do not require prior approval of FIPB.
- **India Infrastructure Finance Company Limited** (IIFCL) was incorporated in 2006 for providing long-term loans for financing infrastructure projects that typically involve long gestation periods. IIFCL raises funds from both domestic and overseas markets on the strength of government guarantees. It provides financial assistance both through direct lending to project companies, and by refinancing financial institutions.

5.1. Suggestions to Improve Mobilization of Resources

- The Economic Survey stressed the need to fill the infrastructure investment gap by financing from **private investment**, **institutions** dedicated for infrastructure financing like National Infrastructure Investment Bank (NIIB) and also **global institutions** like Asian Infrastructure Investment Bank (AIIB) and New Development Bank (erstwhile BRICS Bank).
- **Tap Cash Reserves of CPSUs –** there are 50 CPSUs, which collectively have reserves and surpluses of Rs 2,21,157 crore based upon the Public Enterprises Survey, 2003-2004. However, investment by these CPSUs is not more than 30 per cent of total surplus. This disturbing trend towards underinvestment needs to be reversed at once and the CPSUs reinvigorated to undertake massive capital expenditure, diversifying their activities if necessary. Left parties argues that the Government should also seek special dividends from those CPSUs, which are holding very high levels of liquid reserves, in order to finance expenditure in social sectors or infrastructure.
- Effective and efficient shift to **Engineering, Procurement and Construction (EPC) contracts model** where the contractor is responsible for design and construction on a turnkey basis and for a fixed price. It is expected that about 20,000 km of two-lane National Highways would be developed under this model.

6. Panchayat's Finance

In general, Panchayats receive funds in the following ways:

- **Internal Resource** Generation (tax and non-tax).

- **Grants** from the Union Government based on the recommendations of the Central Finance Commission as per **Article 280** of the Constitution.
- **Devolution** from the State Government based on the recommendations of the State Finance Commission as per **Article 243I.**
- **Loans/grants** from the State Government.
- **Programme-specific allocation** under Centrally Sponsored Schemes and Additional Central Assistance.

Across the country, States have not given adequate attention to fiscal empowerment of the Panchayats. One can draw the following broad conclusions:

- Internal resource generation at the Panchayat level is weak.
- This is partly due to a thin tax domain and partly due to Panchayats' own reluctance in collecting revenue.
- Panchayats are heavily dependent on grants from Union and State Governments.
- A major portion of the grants both from Union as well as the State Governments is scheme specific.
- Panchayats have limited discretion and flexibility in incurring expenditure.
- In view of their own tight fiscal position, State Governments are not keen to devolve funds to Panchayats.
- Overall, a situation has been created where Panchayats have responsibility but grossly inadequate resources.

6.1. Suggestions to Increase Revenue of Panchayats

In order to widen their tax base the PRIs will need to explore additional sources of revenue.

- Sectors like transport, tourism and infrastructure have grown remarkably and a part of this growth has also percolated to the rural sector.
- Among the classical items of tax collection – imposition of profession tax, cattle registration fee and vehicle registration fee are the three notable areas which have not been exploited optimally by the Panchayats. The Panchayats need to be more imaginative and assertive in tapping such resources.
- All common property resources vested in the Village Panchayats should be identified and made productive for revenue generation.
- The local community represented by the local Panchayat should have prime right over the income from royalty accrued to the State Government for mining in that area. State Finance Commissions should bear this in mind while finalizing devolution of grants to the rural local bodies. State Governments should consider empowering the PRIs to collect cess on the royalty from mining activities.
- One of the effective and fair tools to improve revenue collection of the local bodies is to **incentivize** their efforts. Panchayats which have shown positive results must be suitably rewarded. This can be done by linking grants and aids from centre and state to their own revenue generation efforts.

7. Urban Local Bodies' Finances

Receipts in case of an urban local body can be broadly classified as follows:

- Tax Revenue – property tax, advertisement tax etc.
- Non-Tax Revenue – income in terms of rent, royalty, interest, fees and profits/dividends, user charges for public utilities such as water, sewage etc.
- Devolution of funds from the State Government
- Grants from Union and State Governments for development schemes
- Borrowings

7.1. Suggestions to Increase Revenue of Urban Local Bodies

- There is lot of scope for improvement in the area of **Property Tax** which is the most important source of revenue for local governments, such as:-
  - **Widening the tax base –** Only 50-60 per cent property is assessed. There are several reasons for low coverage. With urban sprawls, a large number of properties fall outside the legal jurisdiction of the municipal bodies. State laws often provide for exemption to a number of categories of buildings such as those belonging to religious or charitable institutions. A large number of properties belonging to the Union and State Governments are not taxed because of the provisions of **Article 285.** All these properties use services like solid waste management, maintenance of approach roads and general civic amenities. Therefore, Local Governments should be empowered to collect **'service charges'** in respect of these properties.
  - **Improving Collection Efficiency –** It has been experienced that the collection efficiency of municipal taxes is in the range of 40 to 46%. Poor data base management, improper upkeep of records, collusion between tax payers and recovery officers and lack of understanding of the tax regime are the main reasons for low recovery rates.
  - **Making Property Tax Buoyant –** The tax fixed for a property would remain unchanged till such time an overall revision in the property tax was undertaken in the municipal areas. Such revisions in some places did not take place for several years or even decades. The Unit Area Method overcomes this problem to some extent.
- As per 2nd ARC (Administrative Reforms Commission) suggestions, following principles in administration of taxes should be followed:-
  - Transparent and objective levy of tax
  - The cost of collection (for local body) and compliance (for tax payer) should be reduced to a minimum
  - An independent unit under the Chief Executive to monitor the collection of all taxes
  - Levies should be based on self-declaration accompanied by stringent penalties.
- The levy and collection of **appropriate user charges** for various services provided by municipality must be encouraged.
- State governments should enact fiscal management laws stipulating upper limits for borrowings where municipalities borrow from the market on the basis of their own rating.
- The institutional capability of municipal bodies needs to be enhanced as a necessary pre-condition for successful PPP projects.
- Land held by municipal bodies should be used as a leverage for raising infrastructure investment by leasing of these lands and also borrowing against the value of these lands.

8. Previous Years Vision IAS GS Mains Questions

1. Explain the role played by banks for mobilization of resources in India.

Approach:

Straight forward question. Write about how the banks act as an intermediary for mobilization of resources.

Answer:

A well designed financial system promotes growth through effective mobilisation of savings and their allocation to the most productive uses by either following a centralised approach or a decentralised approach or a combination of both. Typically, economies with underdeveloped capital markets adopt a centralised approach, whereby financial intermediaries such as banks mobilise resources from savers and allocate them to borrowers.

Historically, financial intermediation by banks has played a central role in India in supporting the growth process by mobilising savings, particularly after the nationalisation of the 14 major private banks in the late 1960s. Banks have been particularly instrumental in mobilising deposits from the household sector, the major surplus sector of the economy, which, in turn, has helped raise the financial savings of the household sector and hence the overall saving rate.

Notwithstanding the liberalisation of the financial sector and increased competition from various other saving instruments, banks continue to play a dominant role in the financial intermediation of the Indian economy. The deregulation of interest rates has opened up new avenues for banks to mobilise funds at competitive rates. Further owing to the robust growth performance, banks need to provide funding on a sustained scale which could be harnessed by unlocking a large part of domestic savings locked up in unproductive physical assets like gold, real estate etc.

The changing demographics and employment patterns also generate demand for a wide range of financial services such as insurance, housing and other financial products with innovative features. In order to reap the benefits of the changing demographics and employment patterns, banks can re-orient their role as financial intermediaries beyond the traditional confines of passive deposit mobilisation and lending by providing a package of financial services as demanded by the customers. The rural sector also throws up vast opportunities for banks to reap the benefits of low cost large deposit base, which may not be available to other financial intermediaries.

The mobilisation of savings from hitherto untapped areas and conversion of physical savings into financial savings would necessitate introduction of appropriate products to suit the demand of savers. Banks are indeed in an ideal position to do so because of certain inherent characteristics of deposits such as safety and liquidity.

2. In recent years, savings rate in the Indian economy has witnessed a consistent decline. What are the factors responsible for this trend? How has the composition of savings changed in the last few years? Suggest measures to improve and better channelize household savings.

Approach:

Gross Domestic Savings, investment, Gross Capital formation are invariably linked with growth. Answer should be structured as follows:

- Introduce by mentioning the peak in savings in 2008 followed by a down turn.
- Enumerate the causes attributed for the declining trend in savings.
- Composition of Savings in terms of the share of Household saving, Public or government savings and Corporate savings should be highlighted
- Measures to better channelize household savings should be in the context of decline in financial savings and a rise in physical savings such as land and gold in recent years.

Answer:

High Saving rates have been linked with high growth. The composition of domestic savings in India includes three sources i.e. households, the private corporate sector, and the public sector. National savings rate in India had hit an all-time high of 36.9 per cent in FY08, but has been consistently declining ever since. According to the Economic Survey 2014-15 the gross domestic saving, has declined from 33.9 per cent of the GDP in 2011-12 to 31.8 per cent in 2012-13 and further to 30.6 per cent in 2013-14. Factors that can be attributed for this trend are:

- Slowdown in overall economic growth
- Diminishing returns on Savings for the Household sector due to factors such as inflation.
- Decreasing productivity and profit in the Corporate sector.

As far as the changes in the composition of saving in the last few years is concerned the following can be observed:

- Household savings remain the largest contributor but its share has been declining. From 25.9 % of GDP in 2009 to 17.8% in 2013-14.
- The corporate sector as part of the Domestic savings has seen and upward trend and constitutes the second largest share after the household sector.
- The share of Public sector savings has seen a consistent decline over the years From 5% of the GDP in 2008- it came down to 1.6% in 2013-14.

A sharp decline in the household savings and a decline in financial savings (bank deposits insurance, shares etc) vis-à-vis physical savings (Real Estate, Gold etc.) has been identified as key areas of concerns. Following Suggestion can be made to better channelize household savings in India:

- Curbing inflation
- Expanding financial inclusion
- Offering new products such as inflation indexed bonds.
- Improving saver access to financial products.

3. What do you understand by Green Finance? Explain its importance and discuss the issues related to use of Green Finance in the context of India.

Approach:

- Explain the meaning of Green Finance.
- Explain its importance in the context of India.
- Discuss issues related to Green Finance

Answer:

Green Finance refers to financial investments flowing towards sustainable development projects and initiatives. The thematic areas that Green Finance covers are clean energy, energy efficiencies, sustainable transport, water and waste management, biofuels etc.

Importance of Green Finance

Green finance has attained a lot of importance in the past few years due to increased focus of Green development. In 2015, green bonds issued by governments, banks, corporate and individual projects amounted to USD 42 billion.

Green Finance is very relevant in the context of India. The Indian government policies and programs in various sectors require huge funding and most of these are related to sustainable development. Attainment of renewable energy target of 160 GW by 2022, development of smart cities, providing green infrastructure in terms of transport etc. requires Green Finance.

The resources of the public sectors are constrained and there is an urgent need for private finances to invest in green projects and infrastructure development. For this, developing countries like India need to develop a robust green bond market through international collaboration in information and knowledge sharing and encouraging private sector to invest

The **major issues** related to Green Finances are:

- **Lack of internationally agreed universal definition** of Green Finance with specific standards in terms of use of proceeds, evaluations, management of proceeds, financial reporting and procedures.
- Most of Green technology is with developed countries and under protected realm of IPR.
- Green Finance should not only be limited to renewable energy investments but also to greening of coal technologies and poverty programs etc.
- With respect to India, low credit ratings of potential issues of Green Finance and high costs of issuances act as impediments.
- Green Finance should also consider unsustainable pattern of consumptions as parameters in deciding finance, particularly conspicuous consumptions and unsustainable lifestyle in developed countries.

India has started issuing green bonds for renewable energy projects. The government needs to provide specific tax incentives, increase PSL targets for Green Finance and diversify the process of Green Finance to areas not limited to renewable energy to realize the full potential.

4. As the recently released data shows, a narrow tax base remains a major concern in India. What are the possible reasons for such a scenario? In this context, also examine the government efforts to address the issue.

Approach:

- Give a brief picture of the narrow tax base in India.
- Bring out various reasons for the narrow tax base.
- Enumerate and examine various steps taken by government to widen the tax base.

Answer:

The recently released data shows that only 2.9 crores Indian filed personal income tax returns for 2012-13, which is less than 4% of total adult population. More than half of 2.9 crores paid no tax at all. This is too less for effective functioning of any state as tax is the main source of government revenue and determines the capacity of government programmes.

Reasons:

- Low level of incomes so that most of the population remains below the tax net.
- Complex maze of taxes which hinders effective compliance.
- Presence of various exemptions in tax laws, which are utilized by tax payers to lower tax burdens.
- Failure of authorities to check tax evasion.
- Large informal sectors and mostly cash economy which makes it difficult for tax authorities to detect flow of money.
- Flow of black money in the economy.

The government has recognized the need to increase the tax base and has taken the following steps:

- Increasing voluntary compliances and making tax filing user friendly.
- DTC to codify all direct tax laws under one law which would use simple language, provide simplicity and stability in tax structure, consolidate taxing provisions, definitions, exemptions, incentives and procedures to make them uniform.

- The government appointed the Tax Administration and Reforms Commission to recommend ways to enhance tax base.
- Passing of Black Money Act and the Benami Transaction Act to grab tax evaders
- Implement GAAR from April 2017.
- Increased use of technology, e-filling, collecting data from multiple sources and quick disposal of cases to prevent tax evasion.
- In recent budget, introduction of presumptive taxation regime for small businesses and certain service providers.

These steps are the need of the time. However, measures like Black Money Act have limited effectiveness and need international cooperation as well. Hence, more needs to be done:

- Push for Multilateral agreement to address the issue of tax havens.
- Lower the ceiling of tax imposition.
- Gradual withdrawal on exemptions provided on investment and saving schemes.

9. Previous Years UPSC Mains Questions

1. Among several factors for India's potential growth, savings rate is the most effective one. Do you agree? What are the other factors available for growth potential?
2. Craze for gold in Indians have led to a surge in import of gold in recent years and put pressure on balance of payments and external value of rupee. In view of this, examine the merits of Gold Monetization Scheme.

STORAGE TRANSPORT AND MARKETING OF AGRICULTURAL PRODUCE AND ISSUES AND RELATED CONSTRAINTS

Contents

1. Storage and Warehousing

Storage is an important marketing function, which involves holding and preserving goods from the time they are produced until they are needed for consumption.

- The storage of goods, therefore, from the time of production to the time of consumption, ensures a continuous flow of goods in the market.
- Storage protects the quality of perishable and semi-perishable products from deterioration.
- Some of the goods e.g. woolen garments, have a seasonal demand. To cope with this demand, production on a continuous basis and storage become necessary.
- It helps in the stabilization of prices by adjusting demand and supply.
- Storage is necessary for some period for performance of other marketing functions.
- Storage provides employment and income through price advantages.
- Storage enables states to meet a catastrophe or emergency or to protect against insects, mites, rodents, fungi and bacteria.
- Storage also helps in meeting the needs in scarcity or famine

1.1. Types of Storages

1.1.1. Underground Storage Structures

Underground storage structures are dugout structures similar to a well with sides plastered with cowdung. They may also be lined with stones or sand and cement. They may be circular or rectangular in shape. The capacity varies with the size of the structure.

Advantages

- Underground storage structures are safer from threats from various external sources of damage, such as theft, rain or wind.
- The underground storage space can temporarily be utilized for some other purposes with minor adjustments; and
- The underground storage structures are easier to fill up owing to the factor of gravity.

1.1.2. Surface Storage Structures

Foodgrains in a ground surface structure can be stored in two ways - bag storage or bulk storage.

A. Bag storage

- Each bag contains a definite quantity, which can be bought, sold or dispatched without difficulty.
- Bags are easier to load or unload.
- It is easier to keep separate lots with identification marks on the bags.
- The bags which are identified as infested on inspection can be removed and treated easily; and
- The problem of the sweating of grains does not arise because the surface of the bag is exposed to the atmospheres.

B. Bulk or loose storage

- The exposed peripheral surface area per unit weight of grain is less. Consequently, the danger of damage from external sources is reduced; and
- Pest infestation is less because of almost airtight conditions in the deeper layers.
- The government of India has made efforts to promote improved storage facilities at the farm level.

1.2. Improved Grain Storage Structures

A. For small-scale storage

- **PAU bin:** This is a galvanized metal iron structure. Its capacity ranges from 1.5 to 15 quintals. Designed by Punjab Agricultural University.
- **Pusa bin:** This storage structure is made of mud or bricks with a polythene film embedded within the walls.
- **Hapur Tekka:** It is a cylindrical rubberised cloth structure supported by bamboo poles on a metal tube base, and has a small hole in the bottom through which grain can be removed.

B. For large scale storage

- **CAP Storage (Cover and Plinth):** It involves the construction of brick pillars to a height of 14" from the ground, with grooves into which wooden crates are fixed for the stacking of bags of foodgrains. The structure can be fabricated in less than 3 weeks. It is an economical way of storage on a large scale.
- **Silos:** In these structures, the grains in bulk are unloaded on the conveyor belts and, through mechanical operations, are carried to the storage structure. The storage capacity of each of these silos is around 25,000 tonnes.

Buffer Stock Policy of the GOI

The concept of buffer stock was first introduced during the IV Five Year Plan (1969-74).

Buffer stock of food grains in the Central Pool is maintained by the GOI for:

- meeting the prescribed minimum buffer stock norms for food security
- monthly release of food grains for supply through TPDS and Other Welfare Schemes
- meeting emergency situations arising out of unexpected crop failure, natural disasters, etc.
- price stabilisation or market intervention to augment supply so as to help moderate the open market prices.

1.3. Warehousing

Warehouses are **scientific storage structures** especially constructed for the protection of the quantity and quality of stored products.

Role of Warehousing

- **Scientific storage:** The product is protected against quantitative and qualitative losses by the use of such methods of preservation as are necessary.
- **Financing:** Warehouses meet the financial needs of the person who stores the product. Nationalized banks advance credit on the security of the warehouse receipt issued for the stored products to the extent of 75 to 80% of their value.
- **Price Stabilization:** Warehouses help in price stabilization of agricultural commodities by checking the tendency to making post-harvest sales among the farmers.
- **Market Intelligence:** Warehouses also offer the facility of market information to persons who hold their produce in them.

Working of Warehouses

- **Acts**: The warehouses (CWC and SWCs) work under the respective Warehousing Acts passed by the Central or State Govt.
- **Eligibility**: Any person may store notified commodities in a warehouse on agreeing to pay the specified charges.
- **Warehouse Receipt (Warrant)**: This is receipt/warrant issued by the warehouse manager/owner to the person storing his produce with them. This receipt mentions the name and location of the warehouse, the date of issue, a description of the commodities, including the grade, weight and approximate value of the produce based on the present prices.

- **Use of Chemicals**: The produce accepted at the warehouse is preserved scientifically and protected against rodents, insects and pests and other infestations. Periodical dusting and fumigation are done at the cost of the warehouse in order to preserve the goods.
- **Financing**: The warehouse receipt serves as a collateral security for the purpose of getting credit.
- **Delivery of produce**: The warehouse receipt has to be surrendered to the warehouse owner before the withdrawal of the goods. The holder may take delivery of a part of the total produce stored after paying the storage charges.

Types of Warehouses

On the basis of Ownership

a. **Private warehouses**: These are owned by individuals, large business houses or wholesalers for the storage of their own stocks. They also store the products of others.
b. **Public warehouses**: These are the warehouses, which are owned by the govt. and are meant for the storage of goods.
c. **Bonded warehouses**: These warehouses are specially constructed at a seaport or an airport and accept imported goods for storage till the payment of customs by the importer of goods. These warehouses are licensed by the government for this purpose. The goods stored in this warehouse are bonded goods. Following services are rendered by bonded warehouses:
    i. The importer of goods is saved from the botheration of paying customs duty all at one time because he can take delivery of the goods in parts.
    ii. The operation necessary for the maintenance of the quality of goods - spraying and dusting, are done regularly.
    iii. Entrepot trade (re-export of imported goods) becomes possible.

On the basis of Type of Commodities Stored

a. **General Warehouses:** These are ordinary warehouses used for storage of most of foodgrains, fertilizers, etc.
b. **Special Commodity Warehouses**: These are warehouses, which are specially constructed for the storage of specific commodities like cotton, tobacco, wool and petroleum products.
c. **Refrigerated Warehouses**: These are warehouses in which temperature is maintained as per requirements and are meant for such perishable commodities as vegetables, fruits, fish, eggs and meat.

1.3.1. Warehousing in India

Central Warehousing Corporation (CWC)

CWC was established as a statutory body in 1957. It provides safe and reliable storage facilities for about 120 agricultural and industrial commodities.

Functions

- To acquire and build godowns and warehouses at suitable places in India.
- To run warehouses for the storage of agricultural produce, seeds, fertilizers and notified commodities for individuals, co-operatives and other institutions.
- To act as an agent of the govt. for the purchase, sale, storage and distribution of the above commodities.
- To arrange facilities for the transport of above commodities.
- To subscribe to the share capital of state Warehousing corporations.
- To carry out such other functions as may be prescribed under the Act.

- Special storage facilities have been provided by the Central Warehousing Corporation for the preservation of hygroscopic and fragile commodities.
- The corporation has also evolved techniques for the storage of spices, coffee, seeds and other commodities.

State Warehousing Corporations (SWCs)

Separate warehousing corporations were also set up in different States of the Indian Union. The areas of operation of the State Warehousing Corporations are centres of district importance. The total share capital of the State Warehousing Corporations is contributed equally by the concerned State Govt. and the Central Warehousing Corporation.

Warehousing Development and Regulatory Authority (WDRA)

The Warehousing Development and Regulatory Authority (WDRA) was set up by the Government of India in 2010 to ensure implementation of the provisions of the Warehousing (Development & Regulation) Act, 2007. The main objective of WDRA is to implement **Negotiable Warehouse Receipt (NWR) System** in the country, which would help farmers to store their produce in scientific storage godowns nearby their farms and to seek loan from banks against their NWR. The **main functions** of the Authority are to make provisions for the development and regulation of warehouses which inter alia includes negotiability of warehouse receipts, registration of warehouses, promotion of scientific warehousing of goods, improving fiduciary trust of depositors and banks, enhancing liquidity in rural areas and promoting efficient supply chain.

Food Corporation of India (FCI)

Apart from CWC and SWCs, the Food Corporation of India has also created storage facilities. The Food Corporation of India is the single largest agency which has a capacity of 26.62 million tonnes.

The Food Corporation of India was setup under the Food Corporations Act 1964, in order to fulfill following objectives of the Food policy :

- Effective price support operations for safeguarding the interests of the farmers.
- Distribution of food grains throughout the country for Public Distribution System; and
- Maintaining satisfactory level of operational and buffer stocks of food grains to ensure National Food Security.

Since its inception in 1965, having handled various situations of plenty and scarcity, FCI has successfully met the challenge of managing the complex task of providing food security for the nation. A strong food security system which has helped to sustain the high growth rate and maintain regular supply of wheat and rice right through the year. Today it can take credit for having contributed a great deal in transforming India from a chronically food deficit country to one that is self-sufficient.

Golden Principles for Preservation of Food Grains without Deteriotation/Loss

- Food grain bags should be received with proper dunnages as per stack plan to facilitate cross ventilation/inspection/QC treatments and ensuring stacks are formed to full capacity and avoid part stacks.
- Maintaining excellent hygienic conditions all around the stacks/ godowns /operational points and avoiding loose spillages by ensuring cleaned spillages are put into palla bags to respective stacks.
- Effective personal supervision of prophylactic (spraying) treatments with correct dosage and immediate curative treatments (fumigation) on finding insects in a stack to avoid cross infestation on the lines of “A stitch in times saves nine”.

- Ensuring provision of adequate Tarpaulins/polythene bits to the minimum size of 10' x 10' at the operational points of receipts/ issues to avoid mixing of spillages with mud and possible losses.
- Ensuring spreading of tarpaulins/polythene bits/gunny wrappers on the decks of trucks before loading of food grains bags to avoid oozing enroute and proper full covering of loaded bags with tarpaulins to avoid pilferages, without complacency.
- Ensuring adequate aeration of stacks by opening all doors on all clear days.
- Completely avoiding dumping of spillages on the stacks.

Procurement of Foodgrains

To nurture the Green Revolution, the Government of India introduced the scheme of minimum assured price of food grains which are announced well before the commencement of the crop seasons, after taking into account the cost of production/inter-crop price parity, market prices and other relevant factors.

- The Food Corporation of India along with other Government agencies provide effective price assurance for wheat, paddy and coarse grains.
- FCI and the State Govt. agencies in consultation with the concerned State Govts. establish large number of purchase centres throughout the state to facilitate purchase of foodgrains.
- Centres are selected in such a manner that the farmers are not required to cover more than 10 kms. to bring their produce to the nearest purchase centres of major procuring states.
- Price support purchases are organized in more than 12,000 centers for wheat and also more than 12,000 centers for paddy every year in the immediate post-harvest season.
- Such extensive and effective price support operations have resulted in sustaining the income of farmers over a period and in providing the required impetus for higher investment in agriculture for improved productivity.
- Each year, the Food Corporation purchases roughly 15-20% of India's wheat production and 12-15% of its rice production.
- This helps to meet the commitments of the Public Distribution System and for building pipeline and buffer stock.

1.4. Cold Storage

Despite, India being the largest producer of fruits and second largest producer of vegetables in the world, per capita availability of fruits and vegetables is quite low because of **post harvest losses,** which account for **about 25% to 30% of production**. Besides, quality of a sizable quantity of produce also deteriorates by the time it reaches the consumer. Most of the problems relating to the marketing of fruits and vegetables can be traced to their perishability. Perishability is responsible for high marketing costs, market gluts, price fluctuations and other similar problems. At low temperature, perishability is considerably reduced and the shelf life is increased and thus the importance of cold storage or refrigeration.

Availability of proper cold storages are important for preserving perishable commodities like milk, meat, eggs, vegetables, fruits, ornamental flowers and other floricultural goods. These cold storages give perishable food items a longer shelf life by preventing them from rotting due to humidity, high temperature and micro-organisms. This results in a decrease in loss due to spoilage.

Different products are stored at different temperatures. Flowers will remain fresh even in a moderately cool chiller whereas a product like meat needs to be deep frozen to prevent it from turning rancid. The government trains managers and operators of cold storages to store products at the optimum temperature, maintain machinery, hygiene and administration. With a view to ensuring the observance of proper conditions in the cold stores and to providing for

development of the industry in a scientific manner, the govt of India promulgated an order known as "Cold Storage Order, 1964" under Section 3 of the Essential Commodities Act,1955.

The Directorate of Marketing and Inspection of the Department of Agriculture and Co-operation provides consultancy and technical services to prospective entrepreneurs for the construction, maintenance and operation of cold storages. Other activities that the Directorate of Marketing and Inspection is involved in are preparation of a master plan for cold storage requirements at micro/macro levels, conducting seminars, problem oriented studies and coordinating research in cold storage.

Status of Cold Storage in India

The estimated annual production of fruits and vegetables in the country is about 130 million tonnes. This accounts for 18% of our agricultural output. Due to diverse agro climatic conditions and better availability of package of practices, the production is gradually rising. Although, there is a vast scope for increasing the production, the lack of cold storage and cold chain facilities are becoming major bottlenecks in tapping the potential. The cold storage facilities now available are mostly for a single commodity like potato, orange, apple, grapes, pomegranates, flowers, etc. which results in poor capacity utilization.

Storage of foods and Storage Conditions

In general, there are three groups of products:

1. Foods that are alive at the time of storage, distribution and sale e.g. fruits and vegetables,
2. Foods that are no longer alive and have been processed in some form e.g. meat and fish products, and
3. Commodities that benefit from storage at controlled temperature e.g. beer, tobacco, khandsari, etc.

Living foods such as fruits and vegetables have some natural protection against the activities of micro-organism. The best method of preserving these items is to keep the product alive and at the same time retard the natural enzyme activity which will retard the rate of ripening or maturity.

Preservation of non-living foods is more difficult since they are susceptible to spoilage. The problem is to preserve dead tissues from decay and putrefaction. Long term storage of meat and fish product can only be achieved by freezing and then by storing it at temperature below -15°C. Only certain fruits and vegetables can benefit from freezing. However, for fruits and vegetables one should be very careful about the recommended storage temperature and humidity a deviation from which will have adverse effect on the stored product leading to even loss of the entire commodity.

Products such as apples, tomatoes, oranges, etc. cannot be frozen and close control of temperature is necessary for long term storage. Some product can also be benefited by storing under controlled atmosphere and modified atmosphere conditions.

Dairy products are produced from animal fats and therefore non living foodstuffs. They suffer from the oxidation and breakdown of their fats, causing rancidity. Packaging to exclude air and hence Oxygen can extend storage life of such foodstuffs.

Construction of cold storage facility- Assistance from Government

The following support is provided by the Government for construction of cold storages under the following schemes:

- Under the scheme of **National Horticulture Mission**, assistance is provided for development of post harvest infrastructure including construction of cold storages.

- Under the Scheme of **Technology Mission for Integrated Development of Horticulture in North-Eastern States including Sikkim, Jammu and Kashmir, Himachal Pradesh and Uttarakhand (TMNE)** assistance is provided for post harvest management including for creation/ modernization/ expansion of cold storages.
- **National Horticulture Board** is implementing the scheme of Capital Investment Subsidy for construction/ Expansion /modernization of cold storage and storages for horticulture produce, under which assistance is provided for creation/ modernization/expansion of cold storages.
- **Agricultural & Processed Food Products Export Development Authority (APEDA**) provides assistance under scheme of Infrastructure Development for setting up of integrated pack houses with cold store facilities.
- **Ministry of Food Processing Industries** provides assistance for cold chain infrastructure development including that of cold storages under the scheme for Cold Chain, Value Addition and Preservation Infrastructure.

1.5. National Policy on Handling, Storage and Transportation of Foodgrains

With a view to minimizing storage and transit losses and to introduce modern technology, the Government approved the National Policy on Handling, Storage and Transportation of Foodgrains in June 2000. Under this policy, integrated bulk handling, storage and transportation facilities to the tune of 5.5 lakh MTs at various locations were created through private sector participation on Build-Own-Operate (BOO) basis.

The main thrust of the policy is:

- declaration of foodgrains storage as infrastructure
- encouragement of mechanical harvesting, cleaning and drying at farm and market level
- transportation of grains from farm to silos by specially designed trucks
- construction of chain silos at receipt as well as distribution points
- encouraging private sector for building storage capacities in which grains procured by Government agencies would be stored on payment of storage charges
- encouraging private sector for development of infrastructure for the integrated bulk handling, storage and transportation of foodgrains.

1.6. Integrated Cold Chain Availability Platform

Integrated Cold Chain Availability Platform is envisaged to be a national database that enables active linkage between multiple cold-chain assets across owners, promoting integration of use though collaboration. It is a joint effort of various institutions like National Horticulture Board, Agricultural and Processed Food Products Export Development Authority, Ministry of Food Processing Industries and National Centre for Cold-chain Development. It is expected to facilitate access to impartial information on integrated cold chain capacities and movement of goods.

Intended users

The intended users include cold-chain asset owners, Farm producers, processors, retailers, government agencies.

Expected benefits

- Direct access to nationwide cold storage capacity created.
- Information to users and regulators on operational availability.
- Will promote linking and integrating activities of cold-chain assets.

- Will allow Farmer producer organizations to plan perishable movement across country.
- Will provide information to agriculture ministry on trade impact in cold-chain sector.
- Will empower government to plan viable public procurement mechanisms basis available cold-chain infrastructure.
- Will bring traceability to food supply chain in perishables sector.
- Will serve as space selling platform for asset owners.
- Will promote buy-sell transactions of perishable goods that are in transit in the chain.
- Will allow alignment of cold storages with marketing act by getting considered as transaction platforms, without the physical diversion of produce to non- cold-chain yards.
- Will add transparency to cold-chain development, to regional availability and about trade lanes for perishables.
- Will provide updated information on energy consumptions and its monitoring in cold-chain.
- Will allow for improved demand-supply gap analysis and guide future cold- chain development

1.7. Issues with Storage

- **Storage of food grains in open space**: Normally storage in open is supposed to be resorted to during peak procurement seasons. Unfortunately, lot of stock is lying in the open where even the plinths are not available. During procurement season, for want of adequate CAP storage facilities, stocks are simply dumped/stacked on open spaces wherever feasible and much of these stocks get damaged because of seepage of water from the ground in the absence of proper plinth or height of ground or due to floods and rains.
- **Poor condition of storage facilities**: Utter **disregard to safe and scientific storage practices** have resulted in excessive damages to food grains in the central pool maintained by SGAs. In addition, failure to ensure early disposal of damaged stock led to blockage of storage space.
- **Storage of old crops leading to damage of food grains**: As per the extant policy of issue of food grains of FCI, the principle of First-In-First-Out (FIFO) should be strictly followed with respect to the crop year as well as within crop year during which the stocks are accepted.
- **Efficient capacity utilization**: Despite storage constraints in FCI, the utilization of existing storage capacity in various states/UTs was less than 75% in majority of the months during the period 2006-07 to 2011-12. However, the capacity utilization may not be optimal due to reasons of sudden unanticipated increase in offtake for a particular region or due to unanticipated decrease in procurement.

1.8. Way Forward

- To save costs, proper plinths should be constructed in vacant government lands which can be used for temporary storage of food grains during peak procurement seasons.
- Poor and reckless management and cumbersome paperwork leading to non-availability of storage space even if the space is held by damaged stock for want of disposal approvals from FCI should be dealt with appropriately by decentralized decision making.
- Non adherence of safe and scientific storage methods should be dealt with an iron hand and the strictest of punishment is to be enforced and accountability fixed
- Timely and systematic evacuation planning can lead to utilization of vacant storage space and minimize payment of carry over charges to state government agencies which can come in handy for construction of covered storage
- Adequate planning well in advance for requisitioning of railway rakes can lead to minimization of losses and increase the economic and efficient utilization of available storage spaces.

- Proper integration of all regions with an efficient and robust MIS manned by efficient and competent professionals will definitely bring about the much needed change in the storage sector
- Intervention of state governments in identifying and handing over land for construction of covered storage spaces without undue delay in obtaining of various clearances will speed up addition of storage capacity.

2. Transport

Ensuring accessibility to food in a country of India's size is a herculean task. The foodgrains are transported from the surplus States to the deficit States. FCI undertakes movement of foodgrains in order to:

A. Evacuate stocks from surplus regions
B. Meet the requirements of deficit regions for NFSA/TPDS and Other Schemes
C. Create buffer stocks in deficit regions

The foodgrain surplus is mainly confined to the Northern States, transportation involves long distance transportation throughout the country. Stocks procured in the markets and purchase centers are first collected in the nearest depot and from there dispatched to the recipient States within a limited time.

- FCI moves about 270 Lakh tonnes of foodgrains over an average distance of 1500 Kms.
- Movement of foodgrains is undertaken by Rail, Road and Waterways. Around 85% of stocks are moved by rail to different parts of the country.
- Inter-State movement by road is mainly undertaken in those parts of the country which are not connected by rail.
- A small quantity is also moved by ocean vessels to Lakshadweep and A&N Islands as well as through coastal shipping and riverine movement to Kerala/Agartala (Tripura).

2.1. Procurement and Distribution of Foodgrains

The national objective of **growth with social justice and progressive improvements in the living standards** of the population make it imperative to ensure that foodgrain is made available at reasonable prices.

Under the existing procurement policy of the Government of India (GOI, **foodgrains for the Central Pool are procured by various agencies** such as FCI, State Government Agencies (SGAs) and private rice millers. Procurement of **wheat and paddy** for the Central Pool is carried out on **open ended basis** (i.e., accepting all the grains that are sold to it by farmers) at the declared Minimum Support Price (MSP) fixed by the GOI. In addition, Sates / Union Territories (UTs), which are presently under **Decentralised Procurement (DCP) scheme** also procure foodgrains for the Central Pool, but directly store and distribute them under Targeted Public Distribution System [TPDS] and Other Welfare Schemes (OWS) based on the allocation made by the GOI. Any surplus stock over their requirement is taken over by FCI and in case of any shortfall in procurement against allocation made by the GOI, FCI meets the deficit out of the Central Pool.

The procured food grains are taken over from State Government Agencies (SGAs) and private rice millers into the Central Pool b**y FCI and are moved from the procuring states to the consuming states** for distribution to the consumers and for creation of buffer stock in various states. Food grains of the Central Pool are stored by FCI in both its own godowns and at hired godowns in different parts of the country. FCI, if so required, may use warehouse receipts as collateral for financing its operations. It is to be noted that

- Public Distribution of foodgrains has always been an integral part of India's overall food policy. It has been evolved to reach the urban as well as the rural population in order to protect the consumers from the fluctuating and escalating price syndrome.
- Continuous availability of foodgrain is ensured through about 4.5 lakhs fair price shops spread throughout the country.
- A steady availability of foodgrains at fixed prices is assured which is lower than actual costs due to Govt. policy of providing subsidy that absorbs a part of the economic cost (about 45%).

3. Agriculture Marketing

Agricultural marketing is mainly the buying and selling of agricultural products. It refers to **all the activities, agencies and policies involved** in the procurement of farm inputs by the farmers and the movement of agricultural produce from the farms to the consumers.

The **National Commission on Agriculture** defined agricultural marketing as a "**process which starts with a decision to produce a saleable farm commodity and it involves all aspects of market structure of system, both functional and institutional, based on technical and economic considerations and includes pre and post- harvest operations, assembling, grading, storage, transportation and distribution"**. The **Indian council of Agricultural Research** includes **three important functions** involved in agricultural marketing**, namely** (a) **assembling** (concentration) (b) **preparation for consumption** (processing) and (c) **distribution**.

3.1. Significance of Agriculture Marketing

- In agriculture, producers have little or no influence on the price of their products. Thus marketing is aimed to provide farmers remunerative prices.
- It is required to provide food of required quality at reasonable prices to the consumers and adequate margins to the middlemen.
- An efficient marketing system minimizes costs and maximizes benefits to all the sections of the society.

3.2. Structure of Agricultural Marketing in India

At present, the structure of Indian agricultural marketing system consists of: Agricultural Co-operative Marketing Societies; Regulated Markets; Public Trading and Futures Trading. Besides, there is private trading, which takes place out of these segments. These are discussed as follows:

3.2.1. Agriculture Co-operative Marketing Societies

Under the cooperative marketing society the members of the society agree to sell their surplus produce to the society. As soon as the members supply the produce to the society, an advance is provided to carry on with their agricultural operations. The society collects the produce of all the members and also of the non-members of the villages in their area of operation, often processes the produce and then disposes it. The society decides the timing of sale depending upon market conditions of the commodity, thus preventing distress sale by individual farmers.

Co-operatives have diversified their activities into other areas such as constructing warehouses, providing credit facilities, processing of agro-products, etc. The agricultural cooperative marketing is generally featured by a four-tiered structure: viz Primary marketing societies at the base level, District/regional federations at the district level, State marketing federations at the State level and National Federation at the apex level. The National Agricultural Co-operative Marketing Federation (NAFED) is the apex co-operative marketing organization in India.

Benefits of Co-operative Marketing Societies

- The marketing society allows collective bargaining. The individual small farmers have weak bargaining power and so could not fetch better price for their products.
- Marketing cooperative advances loans to the farmers and enables them to wait for better prices. It lends them to meet their demands.
- Cooperative provides storage and warehousing facilities. The large scale storage allows it to obtain insurance benefits. The loss due to damages of agriculture products can be minimized.
- It encourages the farmers to produce standardized products and discourage them from adulterating their produce.
- It helps to eliminate the middlemen and so allow better price to the cultivators.

3.2.2. Regulated Markets

The regulated markets have been organized in most of the States to facilitate trading in an orderly manner in specified commodities at specified places at the least margin. For this purpose, comprehensive rules have been framed and market committees have been set up to enforce discipline among the participants under the respective State Agricultural Produce Marketing Regulations Acts.

Regulated Market has been **discussed later** in this document.

3.2.3. Public Trading

The objective of Public or State trading is stabilization of prices at levels that are regarded as remunerative to producers and reasonable to consumers. Under the present practice of public trading, the Government purchases specified commodities at notified procurement prices directly from producers and distributes the purchased items among consumers through a network of fair price shops at notified issue prices.

3.2.4. Futures Trading

Future trading has also been allowed to protect the market participants from the risk arising out of adverse price fluctuations. There is a three-tier regulatory structure for conduct of futures trading. At the base level, there are recognized/registered commodity associations/exchanges. At the middle level, SEBI (after merger of FMC with SEBI) regulates the functioning of commodity exchanges and approves their constitution and byelaws. The Department of Consumer Affairs, Ministry of Consumer Affairs, Food and Public Distribution, Government of India is at the top level, which oversees the overall functioning of the forward and futures markets.

Till 1991, futures trading was permitted in only 6 commodities. The process of reform was set in motion with the setting up of Kabra Committee, which submitted its report in 1994. Since then, several measures have been initiated in a phased manner to promote futures markets in the country. But the pace of reforms has so far been slow and cautious. At present, future trading is permitted in 81 commodities under 25 commodity exchanges. Government however has suspended 6 commodities (including wheat and rice) for future trading to curb inflation.

3.3. Regulation of Agricultural Marketing

Agriculture is a **'state'** subject. So, numerous mandis under various APMC laws of states exist where **first sale of notified commodity** happens. Also, there are several central government organisations, who are involved in agricultural marketing like, Commission of Agricultural Costs and Prices, Food Corporation of India, Cotton Corporation of India, Jute Corporation of India, etc. There are also specialised marketing bodies for rubber, tea, coffee, tobacco, spices and vegetables.

Objectives of Regulated Marketing:

- To **prevent exploitation of farmers** by helping them overcome the handicaps in the marketing of their produce through ensuring correct weightment of produce, prompt payment to the farmers, etc.
- To make the marketing system effective and efficient so that **farmers may get remunerative prices** for their produce and the goods are **made available to consumers at reasonable cost**.
- **Elimination** of the **unhealthy and unscrupulous practices**, reducing marketing costs, and providing facilities to the producer-seller in the market.
- To provide **incentive prices to farmers** for inducing them to **increase the production both in terms of quantity and quality**.
- To promote an **orderly marketing of agricultural produce** by improving the infrastructure facilities.

Farmer Producer Companies

It is a hybrid between cooperative societies and private limited companies which provides for sharing of profits/ benefits among the members.

The important features include:

- It is formed by a group of producers for either farm or non-farm activities;
- It is a registered body and a legal entity (under Companies Act, 1956);
- A part of the profit is shared amongst the producers and rest of the surplus is added to its owned funds for business expansion.

There are thousands of rural periodic markets, such as "haats", and more than 7000 government regulated APMCs, besides initiatives of numerous cooperative development, and private corporate sector that engage with farmers directly or indirectly. The government has also played an important role in **price stabilization through market intervention**. Numerous rules and regulations related to **food safety, transportation, weights and measures, food standards**, and so on were also brought in to protect interests of producers and consumers. However, over the last one or two decades, **newer needs such as increasing volumes of output, greater horticultural production, price disparity across markets have compelled a review of the APMC system**.

The Ministry of Agriculture and Farmers' Welfare made attempts to overhaul the regulatory system by proposing the **Model APMC Act, 2003** and **Model State/UT Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017**. Notwithstanding some reluctance on the part of different State governments, there now seems to be a consensus that agricultural marketing needs to be reformed and liberalized.

3.4. Agricultural Produce Marketing Committee (APMC)

Agricultural Produce Market Committee (APMC) is a **statutory market committee** constituted by a State Government in respect of trade in certain notified agricultural or horticultural or livestock products, under the Agricultural Produce Market Committee Act issued by that state government.

APMCs are intended to be responsible for:

- ensuring transparency in pricing system and transactions taking place in market area;
- providing market-led extension services to farmers;
- ensuring payment for agricultural produce sold by farmers on the same day;
- promoting agricultural processing including activities for value addition in agricultural produce;
- Publicizing data on arrivals and rates of agricultural produce brought into the market area for sale; and
- Setup and promote public private partnership in the management of agricultural markets

There are about 2477 principal regulated markets based on geography (the APMCs) and 4843 sub-market yards regulated by the respective APMCs in India.

The typical amenities available in or around the APMCs are: auction halls, weigh bridges, godowns, shops for retailers, canteens, roads, lights, drinking water, police station, post-office, bore-wells, warehouse, farmers amenity center, tanks, Water Treatment plant, soil-testing Laboratory, toilet blocks, etc.

Major Issues Involved in functioning of APMCs

- Under the APMC Regulation, no exporter or processor could buy directly from the farmers, thereby discouraging processing and export of agri-products. This creates a monoposony (a market situation where there is only one buyer who then exercises control over the price at which he buys) situation.
- Due to above situation of monoposony produce is procured at manipulatively discovered price and sold at higher price, defeating the very purpose of APMCs.
- Markets are overly-regulated leading to lot of corruption and exploitation of farmers.
- Fragmented markets, multiple levy of license fees, limited licenses, late payment for the purchase, unavailability of amenities and services such as facility for grading, storage etc. actually act as an impediment to the cause of farmers rather than benefitting them.
- Only State Govt. could set up markets, thereby preventing the private sector from setting up markets and investing in marketing infrastructure.
- APMCs play dual role of regulator and Market. Consequently, their role as regulator is undermined by vested interest in lucrative trade. Generally, member and chairman are nominated/elected out of the agents operating in that market.

3.5. Model APMC Act, 2003

An efficient agricultural marketing is essential for the development of the agriculture sector as it provides outlets and incentives for increased production and contribute to the commercialization of subsistence farmers. Worldwide Governments have recognized the importance of liberalized agriculture markets. Keeping, this in view, Ministry of Agriculture formulated a model law on agricultural marketing - **State Agricultural Produce Marketing (Development and Regulation) Act, 2003** and requested the state governments to **suitably amend their respective APMC Acts for deregulation of the marketing system in India**, to promote investment in marketing infrastructure, thereby motivating the corporate sector to undertake direct marketing and to facilitate a national market.

The Model APMC Act, 2003 provided for the **freedom of farmers to sell their produce**. The farmers could sell **their produce directly to the contract-sponsors or in the market set up by private individuals, consumers or producers**. The Model Act also increases the competitiveness of the market of agricultural produce by allowing **common registration of market intermediaries**.

Salient Features of the Model APMC Act

- The Preamble of the Act calls for development of **efficient marketing system**, promotion of **agri-processing and agricultural exports** and to lay down **procedures and systems for putting in place an effective infrastructure** for the marketing of agricultural produce.
- Legal persons, growers and local authorities are permitted to apply for the **establishment of new markets** for agricultural produce in any area. Consequently, in a market area, more than one market can be established by private persons, farmers and consumers.
- There will be **no compulsion on the growers to sell their produce** through existing markets administered by the Agricultural Produce Market Committee (APMC). However, agriculturist

who does not bring his produce to the market area for sale will not be eligible for election to the APMC.

- Separate provision is made for notification of '**Special Markets' or 'Special Commodities Markets'** in any market area for specified agricultural commodities to be operated in addition to existing markets.
- A new Chapter on '**Contract Farming**' added to provide for compulsory registration of all contract farming sponsors, recording of contract farming agreements, resolution of disputes, if any, arising out of such agreement, exemption from levy of market fee on produce covered by contract farming agreements and to provide for indemnity to producers' title/ possession over his land from any claim arising out of the agreement
- Provision made for **direct sale of farm produce to contract farming sponsor** from farmers' field without the necessity of routing it through notified markets.
- Provision made for imposition of **single point levy of market fee** on the sale of notified agricultural commodities in any market area and discretion provided to the State Government to fix graded levy of market fee on different types of sales.
- **Licensing of market functionaries is dispensed with** and a **time bound procedure for registration** is laid down. Registration for market functionaries provided to operate in one or more than one market areas.
- Provision made for the establishment of **consumers'/farmers' market** to facilitate direct sale of agricultural produce to consumers
- Provision made for **resolving of disputes**, if any, arising between private market/ consumer market and Market Committee.
- State Governments conferred power to exempt any agricultural produce brought for sale in market area, from payment of market fee.
- Market Committees permitted to use its **funds** among others to create facilities like grading, standardization and quality certification; to create infrastructure on its own or through public private partnership for post harvest handling of agricultural produce and development of modern marketing system.
- The **State Agricultural Marketing Board made specifically responsible** for:
  - setting up of a separate marketing extension cell in the Board to provide market-led extension services to farmers;
  - promoting grading, standardization and quality certification of notified agricultural produce and for the purpose to set up a separate Agricultural Produce Marketing Standards Bureau.
- **Funds of the State Agricultural Marketing Board** permitted to be utilized for promoting either on its own or through public private partnership, for the following:
  - Market survey, research, grading, standardization, quality certification, etc.;
  - Development of quality testing and communication infrastructure.
  - Development of media, cyber and long distance infrastructure relevant to marketing of agricultural and allied commodities.

Criticisms of Model APMC Act

The Model APMC Act does not go far enough to create a national or even state level common market for agriculture commodities. The Act retains the mandatory requirement of the buyers having to pay APMC charges even when the produce is sold directly outside the APMC area. Though the Model Act provides for setting up of markets by private sector, this is not adequate to create competition even within the state since the owner will have to collect fees/taxes on behalf of the APMC in addition to their own charges.

3.6. Model Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017

The Government of India brought in a new draft model law**, Agricultural Produce and Livestock Marketing (Promotion and Facilitating) Act (APLM), 2017** to replace the **Agriculture Produce Markets Committee Act, 2003.**

Objectives

- To create a **single agri-market** where with single licence one can trade agri-produce as well as livestock.
- Better **price realization** for farmers.
- **Doubling farmer's income** by 2022.

Major Provisions of the Draft Model Act

- **Intra-state trade** made available by paying a single fee.
- Traders will be able to sell perishables like fruits and vegetables outside existing mandis (wholesale markets).
- The draft law proposes to **cap market fees and commission charges payable by a farmer** after bringing produce to a wholesale market.
- Cap on levy of market fees is proposed at 2% (of sale price) for fruits and vegetables and 1% for food grains.
- Warehouses and cold storages are to act as regulated markets.
- All **regulatory powers will lie with the office of the director of agricultural marketing** in the state, who will also issue licenses to traders and new private players. As of now, this power lies with the mandis – managed by a board of directors.
- Farmers can directly sell their produce to bulk buyers.

Significance

- It will lead to a **barrier-free unified agricultural market** with one trader licence (interstate trading licence).
- It will allow private players to set up wholesale markets thereby breaking the monopoly of traditional 'mandis'.
- Increased competition among buyers will lead to **better farm-gate prices.**
- The new law will also **reduce wastage of farm produce.**
- Promotion of **electronic trading.**

3.7. Problems facing Agriculture Marketing in India

1. **Poor Warehousing Facilities**: The Indian farmers lack proper warehousing facilities for storing the agriculture produce. The facilities are so poor that the crops are spoiled in the warehouses. Cultivators fail to get good price for its product.
2. **Poor Transportation Facilities:** The roads are unusable in many villages. The connectivity of the village roads with the main roads is still missing in many parts of the country. Thus it is difficult to take output to the markets.

3. **Problem of Distress Selling:** The poverty and indebtedness reduce the capacity to wait for better prices of crops. The cultivators are forced to sell the output to the moneylenders at the cheap price to clear off the debts.
4. **Infrastructure Bottlenecks and Corruption in Mandis**: The farmers may have to wait before selling its produce in the mandis. In some states mandis are very far from the villages. The warehousing facilities are not well-developed in these mandis. The intermediaries charge their own commission from the farmers. The unnecessary deductions are made on the pretext of low quality of produce.
5. **Lack of awareness of future market**: The volume in the commodity market forms a very small percentage of total agriculture trading in India. There is an urgent need to educate farming communities to use commodity markets.
6. **Lack of agro-Processing at large scale**: Processing of agricultural products especially perishable commodities forms only a small percentage of the total production. The major part of the total production is sold in raw form so farmers get lower prices for their products.

3.8. Recent Government Measures to improve Agricultural Marketing in India

1. Drafting of new Model Law- **Agricultural Produce and Livestock Marketing (Promotion and Facilitating) Act, 2017** for reforming agricultural marketing.
2. The Government of India launched **National Agriculture Market** aimed at **unifying agriculture markets**.
3. Karnataka launched **Rashtriya electronic Market Scheme (ReMS)** to unite principal markets in e-platform.
4. NITI Aayog has proposed a **reformed land leasing law** to recognize the tenant and safeguard interest of land owners. The reforms also lay stress on the untapped scope of agro forestry in supplementing farmers' income.
5. NITI Aayog has **launched an index to rank States and UTs** that is based on implementation of seven provisions proposed under model APMC Act, joining eNAM initiative, special treatment to fruits and vegetables for marketing and level of taxes in mandis. These indicators reveal ease of doing agribusiness as well as opportunities for farmers to benefit from modern trade and commerce and have wider option for sale of her/his produce.
6. The Index is **named as "Agricultural Marketing and Farmer Friendly Reforms Index"** and it has a score which can have minimum value "0" implying no reforms and maximum value "100" implying complete reforms in the selected areas. **States and UTs have been ranked in terms of the score of the index**.

4. Way Forward

1. **NITI Aayog Recommendation:** NITI Aayog has identified key reforms required in state APMC acts and is now persuading states to undertake the reforms. These reforms include:
    I. Provision for **e-trading, unified trading license and a single point levy** of market fee
    II. Set up markets in the private sector (**private mandis) and direct marketing** to reduce the intermediaries between producer and buyer.
    III. States advised to **relax the felling and transit rules for trees** grown by farmers on their own lands to encourage agroforestry for supplementary income.
    IV. **Liberalize land lease market –** Niti Aayog has already brought up a model Land leasing law for the same.
    V. **Take fruits and vegetables out of APMC Act.**
    VI. Delink **provisions of compulsory requirement of space** for registration of traders.

2. **Integration of Domestic Markets with International Markets**: The barriers in free marketing across different states especially for foodgrains should be dismantled. This calls for dismantling of restrictions on pricing, trading, distribution and movement of agricultural products within the country. Further, India, being a signatory to the World Trade Organisation (WTO) Agreement, should do away with physical barriers, both for imports and exports, on various agricultural commodities. Simultaneously, it should reduce tariff barriers within a time frame. These steps could facilitate the integration of domestic markets with international markets in due course.
3. **Strengthening Co-operative Marketing Societies**: The progress made by co-operative marketing societies so far, though noteworthy, is not wholly satisfactory. Co-operatives have yet to cover a substantial part of the total agricultural produce. It is, therefore, essential that these co-operatives develop at a faster speed and along right lines. Marketing societies need to be more closely intertwined with other societies dealing with farming inputs, credit, etc. The best way to do so is to establish multipurpose societies to look after all the aspects of agricultural marketing. These societies, apart from organizing the sale of agricultural produce, should undertake construction of their own storage capacity, provide for their own transport, arrange for the processing of produce, grade their goods, organize exports, etc. This will reduce their dependence on other sources and provide a total view of marketing services to the members.
4. **Strengthening of Regulated Market Structure**: The management of regulated markets is entrusted to agricultural produce marketing committees (APMCs) on which different interests are represented. There is an urgent need to make these market committees viable and managerially competent in keeping with liberalized trade atmosphere. The market committees should be headed by marketing professionals. Further, the present number of regulated markets is not enough to meet the growing requirements of the country. There is also an urgent need to develop rural periodic markets in a phased manner with necessary infrastructural amenities to have a strong grass-root level link in the marketing chain.
5. **Re-framing Price Stabilization Policy**: With a view to provide remunerative price to the farmer, food at affordable price to the consumer and sustained growth of marketable surplus, all undesirable restrictions on agricultural trade has to be removed. Public procurement, storage and distribution of foodgrains need to be managed efficiently on commercial lines.
6. **Developing Efficient Commodity Futures Markets**: In order to strengthen the future market Government should set up more commodity exchanges, improve the regulatory and supervisory systems, modernize clearing house operations, upgrade training facilities and establish an enabling legal framework to develop vibrant commodity futures market in India.
7. **Promoting Direct Marketing**: Rythu Bazaars in Andhra Pradesh, Apni Mandis in Punjab & Haryana and Uzavar Santhaigal in Tamil Nadu have shown success. In direct marketing, the market operates outside the purview of Agricultural Produce Marketing Act and will be owned by professional agencies, such as wholesalers, trade associations, NGOs or self-help groups (SHGs). Promotion of direct marketing as one of the alternative marketing structures is beneficial for the farmers as well as the buyers as it enables the former to meet the specific requirements of the latter. Direct marketing enables farmers and buyers to economize on transportation costs, handling charges, market fees, etc., to improve price realization considerably.
8. **Improving Transport Infrastructure**: The traditional rural transport system should be improved. The public investments in the road, railway and waterways should be developed.
9. **Improving Storage Facility**: The private sector needs to be encouraged to enter the warehousing and storage in a big way by extending proper incentives to it. Experiment of the creation of decentralised rural godowns also needs to be pursued more vigorously.

Village Panchayats, co-operatives, SHGs, farmers organisations, NGOs, etc., should also be encouraged to undertake warehousing activity under the scheme. In case of perishable commodities like fruits, vegetables and flowers, the complete cold chain comprising pre-cooling, grading, packaging, cold storage and refrigerated vans should be developed.

10. **Providing Processing, Packaging and Grading Facilities**: Proper cleaning, grading and packaging of primary products will need greater attention not only in the physical markets, but also in the villages from where produce is brought to the market for sale. Besides, there is a need to educate the farmers for proper grading and packaging before they bring the produce to the market. In the changed context, new technologies of packing like tetra packs, ascetic packing, pouches, etc. need to be introduced.
11. **Making Available Credit for Marketing**: Provision of credit by the organized financial system to support agricultural marketing has to grow further. Considerable amount of institutional financing for agricultural marketing is directed towards public organizations. The credit facility available to private traders is quite limited.
12. **Promoting Agricultural Marketing Research**: The agricultural marketing research in the areas of agri-business management, post-harvest management, grading, standardization, quality assurance, export promotion and information technology should be promoted. The agriculture research institutes and universities should be further strengthened to undertake applied and operational research in agricultural marketing, impart training to market functionaries and provide consultancy services to the public as well as private organizations engaged in agricultural marketing. Further, conferences, seminars, and workshops should be conducted from time to time on current and relevant issues to facilitate exchange of views among various market functionaries.

5. Miscellaneous Topics

5.1. National Agriculture Market (NAM)

- NAM, announced in Union Budget 2014-15, is a **pan-India electronic trading portal**, which seeks to connect existing APMCs and other market yards to create a unified national market for agricultural commodities.
- NAM is a "virtual" market but it has a physical market (mandi) at the back end.
- Financial help to implement NAM is given to states through Agri Tech Infrastructure Fund.
- Department of Agriculture and Cooperation is implementing NAM through Small Farmers Agribusiness Consortium which acts as implementing agency.

Need to unify markets

- To ensure better prices to farmers
- To improve supply chain
- Reduce wastages
- Create a unified national market

Expected Benefits

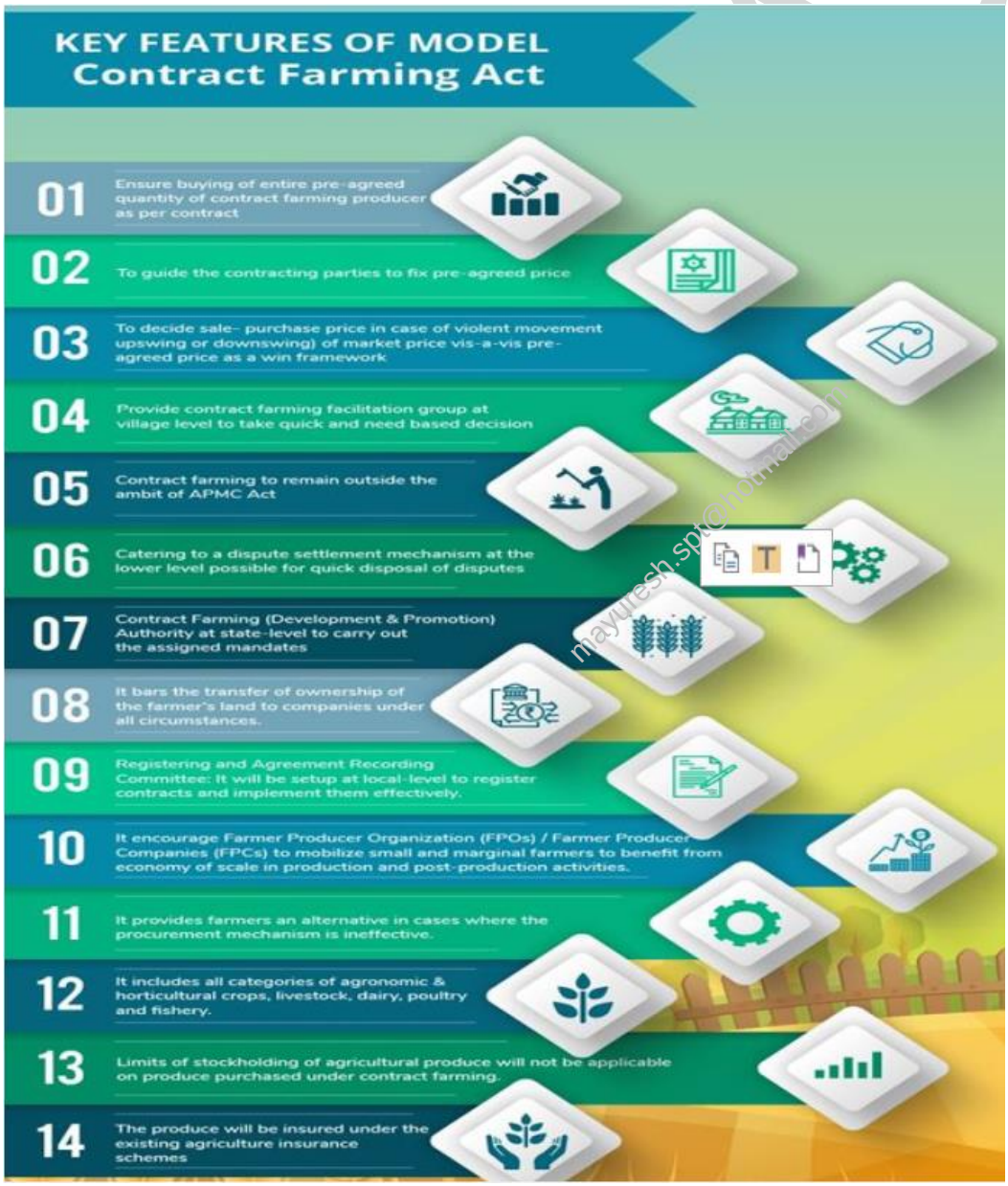
- Increase operational efficiency and transparency in the mandi operations
- Enhance market access and more options for farmers through warehouse based sales
- Larger national market for secondary trading for the local trader in the mandi
- Reduction in intermediation costs for bulk buyers, processors, exporters etc.
- Eliminate information asymmetry
- Will lead to common procedures for issue of licenses, levy of fee and movement of produce In 5-7 years, it will result into higher returns for farmers, lower transaction costs to buyers and stable prices and availability to consumers

- It will also help in emergence of value chains by promoting scientific storage and movement of agricultural goods

5.2. Contract Farming

- Under Contract Farming, agricultural production (including livestock and poultry) can be carried out based on a **preharvest agreement** between buyers (such as food processing units and exporters), and producers (farmers or farmer organisations).
- **Benefit**: The producer can reduce the risk of fluctuating market price and demand while buyer can reduce the risk of non-availability of quality produce.
- It comes under **Concurrent List** of the Seventh Schedule of constitution; however Agriculture is under State list.
- Present laws on contract farming only include one or two farm commodities and are limited to marketing only.

The Government has brought Model Contract Farming Act in 2017. Key features of the Act is shown in figure below.



Challenges with Contract Farming

- **State reluctance:** States have been reluctant to carry forward reform for the fear of loss of revenue.
- **Stockholdings limits** on contracted produce under Essential Commodities Act, 1955 are restrictive and discourage buyers to enter into contracts.
- **Lack of uniformity or homogeneity** among states law regarding kinds of produce, conditions etc. which is needed for allowing contract farming.
- **Promote Regional Inequality**: Currently it is practiced in agriculturally developed states (Punjab, TN etc.) while States with highest concentration of small and marginal farmers are not able to reap its benefit.
- **Supply side issue**: Buyers have no incentive for contract farming with a large number of small and marginal farmers (**average size of landholdings in India was 1.1hectare (census 2011**)) due to high transactions and marketing costs, creating **socio-economic distortions** and preference for large farmers.
- **It's a capital-intensive and less sustainable pattern of cultivation** as it promotes increasing use of fertilizers and pesticides which have detrimental impact on natural resources, environment, humans and animals.
- **Encourages Monoculture Farming**: This will not only impact soil health but also possesses risk of food security and import of food grains
- It **increases dependency of farmers on corporate** for inputs, making them vulnerable.
- Predetermined prices can **deny farmers the benefits of higher prices** prevailing in market for the produce.

5.3. Agricultural Price Policy

Agriculture price has significant impact on producers and buyers of agriculture products. The agriculture price offers incentives to improve production and marketable surplus to the cultivators and affect the allocation of resources.

Nature of Agriculture Price in India

Agriculture prices depict large fluctuations and except for few years in the beginning of planning since 1951 there has been an almost continuous uptrend in the agriculture prices. The causes of such fluctuations are as follows:

1. **Dependence on Rainfall**: The production of agricultural goods is more dependent upon vagaries of nature. A good rainfall results into higher production and scarce or excessive rains/floods have an adverse impact on agricultural output. The erratic natural conditions thus give rise to the sharp variations in the agricultural output supply. These variations in the output gives rise to the large price variations.
2. **Low price Inelasticity of demand of Agricultural Goods**: The demand for agriculture goods particularly food crops don't change with the change in its price. The overproduction in agriculture leads to price crash as demand doesn't increase and under production causes prices to rise as demand doesn't fall.

Objective of Agriculture Price Policy

The stability of agriculture price is essential since the higher agriculture prices affect purchasing power of consumers and greater input cost to the industrial users. The reduction in the purchasing power of the consumer has implication on demand for industrial goods. The broad objectives of agriculture price policy in India are:

- To set remunerative prices with a view to encourage higher investment and production in the agriculture.
- To set the prices at levels so that the consumers are not adversely affected.

- Agriculture prices should be such that the terms of trade between agriculture and non-agriculture sector is not adversely affected.
- To set price in such a manner so that optimal crop mix can be achieved.

Major Instruments of Agriculture Price Policy (APP) in India

APP includes the following instruments:

- Minimum Support Price (MSP) & Procurement prices
- Buffer Stocks

A. MSP and Procurement Prices

The price support policy was initiated by the Government to provide protection to agricultural producers against any sharp drop in farm prices. If there is a good harvest and market prices tend to dip, the government guarantees an MSP or floor price to farmers**, which covers not only the cost of production, but also ensures a reasonable profit margin for the producers**. MSP is announced each year and is fixed after taking into account the recommendations of the CACP (**Commission for Agricultural Costs and Prices**). CACP is an agency which advises the Government on a continuing basis about the level of MSP. Procurement prices are the prices of Kharif and Rabi cereals at which the grain is to be domestically procured by public agencies (for example, FCI [Food Corporation of India]) for release through public distribution services (PDS). Normally, the procurement price is lower than the open market price and higher than MSP. In the present system only one set of prices is announced for crops.

While recommending the prices the CACP takes comprehensive overview of the entire structure of the economy of a particular commodity and the likely effect of the price policy on the rest of economy particularly, on the cost of living, level of wages, industrial cost structure etc. An important consideration underlying the price policy is that it should compensate the farmers for the increasing input cost and provide incentive to increase investment in the agriculture. The MSPs are normally announced upfront before the commencement of sowing operations of the particular crop and have usually been remunerative and significantly higher than the cost.

B. Buffer stocks and Public Distribution System

Buffer stock operations are an integral component of agriculture price in India. It is used as an instrument to minimize the fluctuations in the prices of agriculture products. Buffer stocks have a price stabilizing impact on the economy. Under the buffer stock policy, government builds up stock of agricultural commodities either through purchases from domestic market or through imports and release these stocks in the domestic market when the prices are rising. The government supply thus moderates the sharp increase in the price of agricultural products. In the event of bumper crop, the market price is substantially reduced. In this situation government make procurements at MSP or procurement price and prevent fall in price. This helps to prevent distress sales among farmers. The sufficient buffer stock is required to be maintained to meet emergencies like droughts, crop failures floods and crop damages or other such calamities to prevent sharp rise in market prices.

The public distribution system (PDS) is used to supply the buffer stock to the weaker sections. At present PDS consists of a network of 3,50,000 fair-price shops that are monitored by state governments. Supplying basic food commodities through PDS not only serves the purpose of reaching the needy, it also acts as a control for general consumer prices. FCI is the sole repository of food grains reserved for PDS. The Corporation has functioned effectively in providing price support to farmers through its procurement scheme and in keeping a check on large price increases by providing food grains through PDS.

6. Previous Years Vision IAS GS Mains Questions

1. "Transportation plays an important role in agricultural efficiency and production". Elaborate its importance in agricultural sector.

Approach:

We have to explain how agricultural production, productivity and efficiency are related to transportation. Further, we need to elaborate on the backward and forward linkages of transportation with respect to agricultural processes.

Answer:

Agricultural Productivity is a quantitative term, which measures the ratio of index of agricultural outputs to that of inputs in the farm production. Therefore, it provides an estimate of farm output per unit of input. On the other hand agricultural efficiency is related to the overall viability of agricultural operations, in the sense that it is fruitful for the agriculturalist to carry on with his profession.

An efficient transport system is critically important to productivity as well as efficiency of agricultural operations. If transport services are of poor quality, infrequent, or expensive then it will turn out to be disadvantageous to the farmers. For instance, an expensive transport service will lead to low farm gate prices (the net price the farmer receives from selling his produce).

Insufficient provision of transport services especially during harvest times, low competition of service providers on rural roads, high vehicle operating costs on bad roads, inefficient vehicle operations are other factors related to transportation that act as impediments to a productive and an efficient agriculture system.

Physical availability of transport infrastructure, transport means, frequency, rate, growth and its linkages to important market destinations also affect agricultural production and efficiency. Further, the location of market and storage facility influences the choice of vehicles used in transportation.

There are yet another set of factors which affect the cost of agricultural products. These include price of fuel, fare to travel to market centers for supplying raw materials and taking services from the city centres. Thus by acting as a linkage between the core and the hinterlands, it plays a role of two way linkage.

Keeping in mind the importance of transportation in agricultural production and efficiency, certain measures like viewing all modes of transportation from a systems standpoint rather than separately, tackling funding issues etc. can be taken.

2. One of the principal aims of improving agricultural marketing is to make agriculture more viable for the small farmers in India. In the above context, comment on the strengths and weaknesses of Cooperative and Contract farming in India.

Approach:

First, comment on the state of farmers in general referring to the above statement. Then, bring out the strength and weakness of the cooperative and contract farming in India.

Answer:

Owing to the small land holding size of farmers in India, with more than 85% of farmers having land holdings size less than 2 acres, it becomes increasingly difficult to make agriculture as an economic activity viable for their sustenance, lest only to provide food for the sustenance of the farmer.

Co-operative farming in broad terms refers to pooling of land and practising joint agriculture. Its goal is to bring together all of the land resources of farmers in such an organised and united way so that they will be collectively in a position to grow crops on every bit of land to the best of the fertility of the land.

Cooperative farming helps in achieving **Economies of Scale** for the small farmer. As the size of farm increases, the cost of using machinery (tube wells, tractors etc.) decreases. It further helps in solving the problem of subdivision and fragmentation of holdings. Resources can be pooled by the farmers, which can help in increasing the productivity of land and labour. Case Studies generally point out that with cooperative farming, per acre production increases.

The weakness of the above farming lies in the fact that post-independence it was mainly government driven rather than being initiated by the people themselves. Further, fear of unemployment, attachment to land, lack of proper propaganda renunciation of membership by farmers and existence of fake societies inhabited its growth in India. While there were many loopholes in the government policy, benefiting large farm owners, leading to creation of 'bogus farms', subsidy provided was also not well targeted which further lead to proliferation.

Contract Farming can be described broadly as an institutional arrangement between farm and firm to produce and transact agricultural commodities on predetermined terms. The core of contract farming arrangements is some form of commitment, oral or written, on the part of the farmer to provide a commodity of a particular quality and quantity, grown according to specified methods agreed upon before sowing, with a corresponding commitment on the part of the firm to buy that produce at a pre-fixed price.

The practice, in principle is regarded as a win-win situation for both the farmer and the buyer. The farmer gets an opportunity to link up with a buyer and fix a price even before sowing, thus offering a kind of insurance and for firms, the attractiveness of timely procurement of supplies of quality produce without having to take on the responsibility of managing cultivation on factory owned farms. Further, the direct link between firm and farm implies disintermediation or the elimination of trade-middleman, saving on transaction cost.

The chief problem stems from enforcement issue. Duping farmers of lands, non-transparent quality standards, rejecting produce arbitrarily, altering price when product is delivered, weak law enforcement and legal redressal mechanism are some of the weaknesses of the current system.

3. Reviving the Farm Income Insurance Scheme could be the best tool for marginal farmers to fight falling prices of agricultural products in an increasingly globalized marketplace. Explain.

Approach:

- Briefly introduce the issue of falling prices in an increasingly globalised marketplace and its effect on marginal farmers.
- Explain Farm Income insurance scheme and how it could be the best tool for marginal farmers to fight falling prices.
- One can compare the scheme with present National Crop Insurance Programme and write about the issues in it.

Answer:

Many small and marginal farmers in India are getting low prices for their produce because of increased global production and lower demand for various commodities.

The latest NSSO report highlights the increasing input costs in agriculture and the alarming increase in consumption expenditure vis-à-vis income, especially among households with less than two hectares of land holdings.

The Farm Income Insurance Scheme (FIIS), originally introduced in 2003 and withdrawn the next year, has been revived in Gujarat. The scheme's main thrust is that it tries to ensure guaranteed income by insuring the difference between the farmer's predicted income and the actual income.

It calculates the predicted income by using the product of unit area yields and prices at the district level. Any decrease in the predicted income due to yield fluctuations or market fluctuations is insured under the scheme.

By only considering yield losses from natural perils, it also ensures that farmers are incentivised to produce more, and that inefficiency in farming is not rewarded. The success of FIIS will depend on whether the government is willing to move away from the current mundane system of manual inspection and data gathering to the new era of big data and technology.

When the FIIS pilot was tried a decade ago, it proved to be premature, but the time is right now to correct some of the errors in the previous scheme and move ahead.

The concerns over reliable yield and price data in the earlier attempts can be largely eradicated using present technologies. The maturing of satellite-based yield monitoring systems, integrating agricultural markets in India, and ensuring the efficiency of commodity exchanges will remove most of the concerns that arise over the large amounts of data needed for such a revolutionary scheme.

Additionally, leveraging mobile phone penetration levels and mobile-enabled technologies can ensure the availability of real time data, and reduce the moral hazard problems that afflict current insurance schemes.

The present National Crop Insurance Programme covers prevented/ failed sowing, post-harvest losses, and losses from natural calamities on an individual basis. It is an area-based approach that covers a wide variety of food, oilseed and horticulture crops.

However, low literacy, the absence of infrastructure to measure data accurately at the farm level, and the limited penetration of formal financial credit have made the scheme inefficient, leading to reduced trust among farmers. Additionally, in the current globalised market with widely varying market prices, the scheme is unable to protect farmers against price fluctuations.

4. Most rural poor are excluded from the ambit of the formal financial system, which raises their dependence on informal sources as well as exposure to financial distress. In this context, explain why formal sector lending, especially to farmers, is so limited. Also suggest some steps that need to be taken to increase access to formal credit in rural areas.2016-2-763

Approach:

- Introduce the statement by writing about ineffectiveness of formal financial system in rural areas.
- Discuss the limitation of the government's financial initiatives in rural areas.
- List the relevant remedies.

Answer:

The ratio of agricultural credit to agricultural GDP has increased from 10 per cent in 1999-2000 to around 38 per cent by 2012-13. However, the share of long-term credit in agriculture or investment credit has declined (55 % in 2006-07 to 39% in 2011-12). Moreover the following trends depict the issues with formal credit in rural sector:

- **Inequity in credit disbursed**—the share of loans above Rs.10 lakh is going up and over a quarter of the credit is advanced from urban and metropolitan branches of banks. These loans mostly cater to input dealers, agri-businesses such as food and agro-processing industries and warehousing companies.
- **Steady share of informal sector** in loans to agricultural households (around 40% between 2003 and 2013).
- **The declining share of small loans (less than 2 lakh)**.
- **March Phenomenon**-banks lent over 46% of agricultural credit between January and March— perhaps to meet year-end targets —although farm loans are most likely required before the crop season begins, around June and November.

Reasons for limited formal nature of credit to farmers

- Banks' reluctance to lend to small farmers which is further accentuated by **inherent risks (say, deficit or unseasonal rains)** associated with farming. Partly, the decline could also be due to **rising costs of cultivation, inflationary pressures, and more people moving out of farming**
- A large share of credit has channelized through **non-bank financial intermediaries without collateral;** in contrast to commercial banks, which requires collateral. But they charged higher rate of interest and resorted to coercive practices (example: microfinance crisis in Andhra Pradesh. The credit disbursed by MFIs has not resulted in raising agricultural productivity because these loans require regular monthly repayments and regular meeting and oversight on borrowers)
- **A part of credit under priority lending and interest subvention scheme being diverted to agribusiness, input dealers etc.**
- High cost of disbursing loans in rural areas and mandated interest rates being too low under various schemes.
- Rural branches have declined to 37% of total branches from 54% in 1994.

Steps required to be taken

- **Priority Sector Lending Certificate (PSLCs):** it will provide a market-driven incentive for efficiency, will enable banks to sell their surplus lending and thus earning a premium for their efficiency/geographical spread. RBI has already issued instructions on trading in Priority Sector Lending Certificates in April this year.
- **Popularising Negotiable Warehouse Receipts (NWRs):** The small and marginal farmers with Kisan Credit Cards (KCCs) can also avail the benefit of interest subvention scheme extended for a further period of up to six months (post-harvest) against Negotiable Warehouse Receipts (NWRs) at the same rate as available to crop loan to discourage distress sale of corps by small farmers.
- **Creating Big-sized banks:** which unlike smaller ones, have the ability to cross-subsidize their stakeholders. Former RBI deputy governor K.C. Chakrabarty has highlighted the importance of big banks in improving allocation efficiency between rural and urban areas.
- The government may consider **removing the subvention restrictions** on interest rates. Then banks would be free to set interest at rates that cover their costs and it would make loans viable.

- The bank may **channel credit through non-bank intermediaries** such as MFIs and allow the MFIs to charge rate of interest above the rate charged by banks.
- There should be **provisioning for delivering institutional credit to poor farmers without collateral.** It may lead to increased credit availability to rural poor.
- **Banking correspondents** need to be appointed and adequately incentivized with commissions linked to loan repayments.
- There is also a need to **incentivize the financial institutions** to provide farmers with credit.

5. Discuss the causes and consequences of lack of a common market in Indian agriculture. How can implementation of the National Agriculture Market help in addressing the issues involved?

***Approach**:*

- First briefly define common agriculture market.
- Explain the causes of lack of a common market.
- Explain the consequences of lack of a common market.
- Point out ways in which National Agriculture Market would improve marketing and promote efficiency.

***Answer**:*

A common agriculture market is one wherein there is seamless movement of agriculture goods across districts and state borders, requiring only one license to trade and doing away with intermediate transaction costs.

India has a fragmented agriculture market because of following reasons:

- **APMC Act:** It has led to development of mandis with middlemen leading to fragmentation.
- **Differences in remoteness and connectivity**: some agri regions are well connected while others are isolated even lacking roads
- **Local market power of intermediaries**: concentration of power in few hands leading to abuse by intermediaries of mandis. They are averse to any reform.
- **Disinterest of states**: Since Mandis are source of revenue for states they are not interested in diluting them.
- **Exposure to shocks**: shocks affect regular supply chain hampering dependency
- **Poor storage and supply chain**: Limited storage capacity, inadequate mandi infrastructure and poor transportation facility.
- Multiple taxes across trade.

Lack of a common market results in harm to producers, traders, processors, consumers, etc.:

- **Inadequate competition**: fragmentation leads to requirement of licenses for each mandi by traders hampering adequate participation leading to lack of specialization in subsectors.
- **Inefficient resources allocation**: most of the money is spent on paraphernalia equipment thus denying resources for core activity performance.
- **Large number of intermediaries**: denying price benefits to producers, processors and consumers.
- Low cost for producers, high cost for consumers.
- Greater exposure to travesty of natural shocks, crop failures etc.

National Agriculture Market is a pan-India electronic trading portal which seeks to network existing mandis and other market to create a unified national market for agricultural commodities. NAM is a "virtual" market but it has a physical market (mandi) at the back end. It will help in improving marketing and promoting efficiency in following ways:

- **Increase in competition**: producer can either sell to local traders or online, more trades even from other states can participate by having only one license per trader.
- **Reduction in cost** and **post-harvest losses**: reduction in the number of intermediaries, single levy of transaction cost, assured sales etc. would lower the cost and reduce losses
- **Facilitate emergence of integrated value chains** in major agricultural commodities across country and help to promote scientific storage and movement of agri-commodities.
- Efficient resource allocation.

eNAM would lead to **One Nation – One Market** and this is an important step towards doubling farmers' income in the next five years.

6. Despite being amongst the top agricultural producers, there exists a huge gap between production and availability of food grains and vegetables in India. Analyse the reasons for the same with special focus on post-harvest losses. Also enumerate the steps taken by the government to address the problem.

Approach:

- Introduce the given statement by substantiating some key facts.
- Discuss the reasons including supply chain problems which cause wastage.
- Mention the steps of the government in this regard.

Answer:

India's is the world's largest producer of milk, many fruits and vegetables, and some staples. In recent years India has achieved a record production in food grains. It is favoured by a vast geographical area supported by varied climatic conditions.

Even though India has enough food it is home to about 25 percent of the world's hungry poor. The per capita availability of food grains, fruits and vegetables, vis-a-vis production, is quite low.

Table 4: Per capita Availability and Deficit of other than food grains

Food Items	Per capita availability	ICMR recommendations for Indians	Per capita deficit
Milk	246 grams/day	250 grams/day	06 grams/day
Egg	42 eggs/annum	180 eggs/annum	138 eggs/annum
Vegetables	179 grams per day	300 grams per day	121 grams per day
Fruits	58 grams per day	92 grams per day	34 grams per day

The Per capita amount of food available is typically calculated as production plus imports minus exports divided by the population.

Reasons for the low per capita availability

- **Poverty**: India is a hugely demand-constrained economy due to poor purchasing power reflecting poor access to nutritious food despite high production.
- **Exports**: When demand is low, an increase in local production need not translate into increased availability as a larger portion of the produce may be exported.

- **Government stocks**: Huge public stocks have been built up, foregoing consumption. The food in these stocks is deteriorating because of poor management, reducing availability.
- Huge leakages in **Public Distribution System**
- **Post-Harvest losses:** Around 25-30% of the production is wasted which means the inefficient utilisation of production and lowering of its availability.
- **Absence of a unified Agricultural market** which creates wide differentials in prices for the same commodity in different regions**.** It also leads to sharp seasonal variation of prices.

These higher levels of post-harvest losses are caused by the following:

- **Inefficient supply chain** for the distribution of the fruits and vegetables because of several problems:
  - Numerous stake holders working in isolation
  - Absence of demand forecasting
  - Absence of application of technology improvements
  - Lack of system integration
  - Presence of large number of unorganized retailers
- **Improper bagging** without crating,
- Lack of **temperature controlled vehicles** and **cold chain facilities**. According to research, approximately only 10% of the fruits and vegetables produced in India use cold storage
- Unavailability of enough **processing facilities** for the agricultural produce
- Lack of **vertical integration** of production with processing.

The government has adopted multi-pronged strategy to improve food availability in India:

- **Increase production** through various programmes such as Rashtriya Krishi Vikas Yojana, ISOPOM etc.
- **Increasing purchasing power** through welfare measures such as MGNREGA, NSAP etc.
- **Reducing leakages** by improving PDS through Aadhaar and Direct Benefit Transfer.
- **Rationalising buffer stocks**
- **E-NAM-** pan-India electronic trading portal which networks the existing APMC mandis to create a unified national market for Agriculture.
- **Model APMC act** and exclusion of fruits and vegetables from the purview of State APMC act by certain states.

Several steps have also been taken to reduce post-harvest losses:

- Scheme for Development of Infrastructure for Food Processing having components of Mega Food Parks, Integrated Cold Chain, Value Addition and Preservation Infrastructure and Modernization of Abattoirs
- Scheme for Quality Assurance, Codex Standards, Research & Development and Other Promotional Activities.
- Central Sector Scheme of Cold Chain, Value Addition and Preservation Infrastructure
- Various departments and ministries are providing assistance for setting up cold storages under different schemes

7. Previous Years UPSC Mains Questions

1. Examine the role of supermarkets in supply chain management of fruits, vegetables and food items. How do they eliminate number of intermediaries?
2. In view of the declining average size of land holdings in India which has made agriculture non-viable for a majority of farmers, should contract farming and land leasing be promoted in agriculture? Critically evaluate the pros and cons.
3. What are the impediments in marketing and supply chain management in industry in India? Can e-commerce help in overcoming these bottlenecks?
4. There is also a point of view that agriculture produce market committees (APMCs) set up under the state acts have not only impeded the development of agriculture but also have been the cause of food inflation in India. Critically examine.