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YK GIST - JULY2023

- COOPERATION TO PROSPERITY
- SUSTAINABLE AGRICULTURE DEVELOPMENT

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Under The Guidance Of Mohan Sir (Founder, IASbaba)

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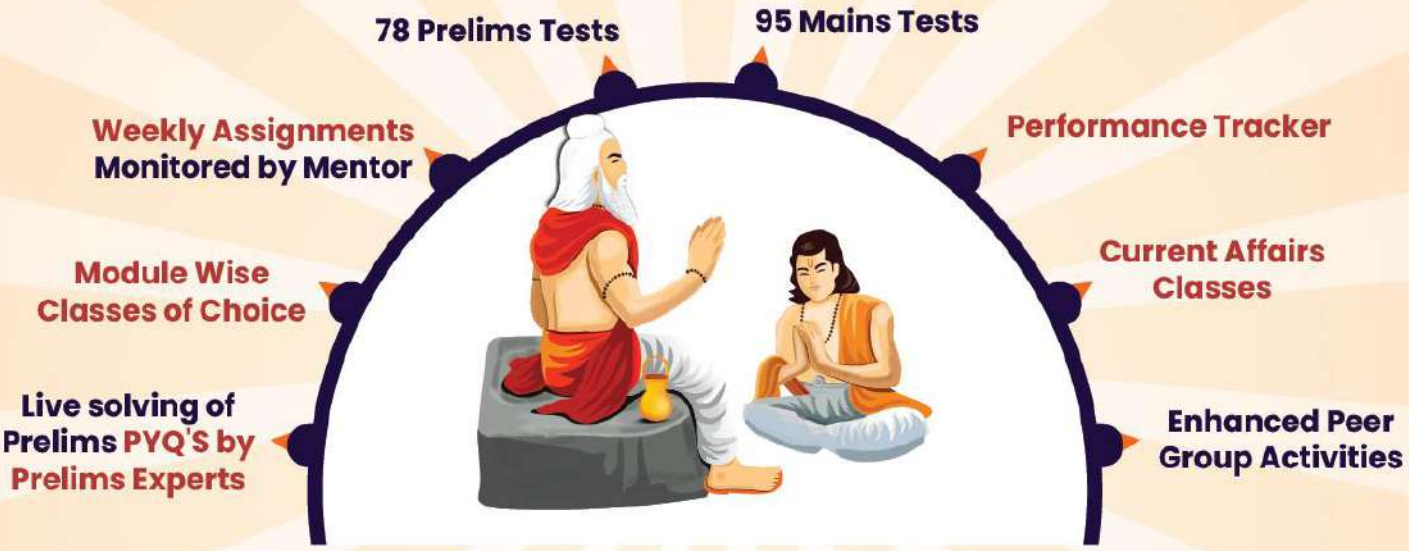

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COOPERATION TO PROSPERITY

What is a Cooperation?

The concept of Cooperation envisages a group of persons having one or more common economic needs, who voluntarily agree to pool their resources-both human and material, and use them for mutual benefit through an enterprise managed by them on democratic lines.

Cooperation is a form of economic organization based on certain values of life. It is a voluntary and democratic association of human beings, based on equality of control, opportunity, and equity of distribution. Further, it stands for the promotion of the common interests of producers and consumers. All economic concerns run for profit and profit-making is their sole objective. But, Cooperation renders services to its members without the sole intention of making profits.

History of India's cooperative movement

According to the International Cooperative Alliance (ICA), cooperatives are people-centred enterprises jointly owned and democratically controlled by and for their members to realise their common economic, social and cultural needs and aspirations.

- Friedrich Raiffeisen, who along with compatriot Schulze-Delitzsch in Germany, and Luzzatti of Italy, pioneered cooperatives in Europe.
- Raiffeisen based them on the principles of self-help, self-governance, and self-responsibility.
- Known for their trustworthiness and resilience against financial crises, most were known as Raiffeisenbanks, spreading to other parts of Europe and America.
- India's cooperative movement originated in the agriculture and related sectors as a means for farmers to pool their resources to prevent exploitation by money lenders.
- India's cooperative movement was formalised at the end of the 19th century, inspired by the German model of agricultural credit banks.
- In 1904, the British government in India enacted the Cooperative Credit Societies Act. While this Act dealt solely with the extension of credit, the sector was opened up to other activities in 1912. Administrative reforms in 1919 transferred cooperatives to provincial control.
- After Independence, the framers of the Constitution placed cooperatives in the State list. They came to be considered instruments of socio-economic development and became an essential focus of the initial Five-Year Plans. As a result, States made their own laws to regulate cooperatives within their jurisdiction.
- Article 43B of Indian Constitution inserted by the 97th Amendment says that "states shall endeavour to promote voluntary formation, autonomous functioning, democratic control and professional management of cooperative societies".
- According to the Ministry of Cooperation, there are around 8.5 lakh cooperatives in India, with about 1.3 crore people directly attached to them.
    - Union government has created a new Ministry of Cooperation in 2021 for strengthening cooperative movement
    - Also, the percentage of cooperative members in proportion to the total population increased from 3.8% in 1950-51 to 22.2% in 2016-17.

- Today, Cooperatives in India range from those providing credit to those producing, procuring, or marketing products like fertilisers, milk, sugar, and fish.
    - Indian Farmers Fertilisers Cooperative (IFFCO) has around a third of the market share in fertilizers, while Gujarat's Amul is a highly profitable dairy cooperative.

What is a Cooperative Society?

An autonomous open and voluntary association of persons of the weaker section of the society, to meet their common socio-economic and cultural needs and aspiration through a jointly owned and democratic control enterprise in accordance with the cooperative values and principles.

What is National Cooperative Database?

The primary goal and purpose of building the National Cooperative Database is to have an Information based Decision Support System.

- Taking the cooperatives movement in the country to a new level by strengthening grassroots-level reach and coordination of activities across sectors.
- Promoting cooperative-based inclusive and sustainable model of economic development.
- Easing operational processes

What are Multi-State Cooperative Societies?

- Cooperatives are a state subject, but there are many societies such as those for sugar and milk, banks, milk unions etc whose members and areas of operation are spread across more than one state.
- For example, most sugar mills along the districts on the Karnataka-Maharashtra border procure cane from both states. They draw their membership from both states, and they are thus registered under the Multi-State Co-operative Societies Act, 1984 (amended in 2002)
- Their board of directors has representation from all states they operate in.
    - The board of directors are from all the States these collectives operate in and controls all finances and administration function.
- Administrative and financial regulation & monitoring of these societies is with the central registrar, with the law making it clear that no state government official can wield any control on them.
- Since the law was enacted, 1,479 such societies have been registered, of which 9 have been deregistered since.
- Maharashtra has the highest number at 567, followed by Uttar Pradesh (147) and New Delhi (133).
- Credit societies constitute the bulk of registered societies at 610, followed by agro-based ones (which include sugar mills, spinning mills etc) at 244. There are 96 multistate cooperative dairies and 66 multistate cooperative banks.

What was 97th Constitutional Amendment Act and what was the judicial verdict on it?

- The Constitution (97th Amendment) Act, 2011 made following changes
    - New **Part IXB** regarding the cooperatives working in India added
    - Part IXB dictated the terms for running co-operative societies like the number of directors a society should have or their length of tenure and even the necessary expertise required to become a member of the society.

- **In Art. 19(1)(c)** the word "cooperatives" was added after "unions and associations". This enables all the citizens to form cooperatives by giving it the status of fundamental right of citizens.
- A new **Article 43B** was added in the Directive Principles of State Policy (Part IV) regarding the "promotion of cooperative societies"

- Gujarat High Court in 2013 had struck down certain provisions of the 97th CAA by reasoning that Parliament cannot enact laws with regard to cooperative societies as it is a State subject. This was appealed by Centre in Supreme Court.
- Supreme Court in July 2021 upheld the validity of the 97th constitutional amendment Act, 2011 but struck down certain provisions of it
  - Struck down part of Part IXB which dealt with cooperative societies confined to states. Court held that co-operative societies come under the **"exclusive legislative power" of State legislature**s and Centre can't shrink State's exclusive authority.
  - However, Part IXB of the Constitution is operative only in so far as it concerns **multi-State co-operative societies.** This is because Multi-State Cooperatives comes under Union List.
  - The court also took exception to the fact that the 97th Constitutional Amendment was passed without ratification from the States.
- **Significance of the verdict**
  - It allays States' fears that new Union Ministry of Cooperation would have dis-empowered them.
  - Judgement reiterates State's exclusive legislative power over cooperatives within their territories.

What are the Constitutional Provisions for a Cooperative Society?

i) Article 19(1)(c) of the Constitution of India states that - All citizens shall have the right to form associations or unions [or co-operative societies]

ii) Directive Principles of State Policy 43B- Promotion of cooperative societies – The State shall endeavor to promote voluntary formation, autonomous functioning, democratic control, and professional management of cooperative societies.

iii) Part IXB of the Constitution of India grants constitutional status to cooperative societies and contains provisions for their democratic functioning.

What are the key provisions of the proposed Multi-State Cooperative Societies (Amendment) Bill, 2022?

- To plug the "loopholes" in the MSCS Act, the Centre introduced a Bill seeking to amend the 2002 law for more "transparency" and increase the "ease of doing business".
- The amendments have been introduced to improve governance, reform the electoral process, strengthen monitoring mechanisms and enhance transparency and accountability.
- The Bill provides for the creation of a central Co-operative Election Authority to supervise the electoral functions of the MSCSs.
- The Bill also seeks to improve the composition of the board and ensure financial discipline, besides enabling the raising of funds in MCSCs.

- It envisages the creation of a Co-operative Rehabilitation, Reconstruction and Development Fund for the revival of sick MSCSs , financed by existing profitable MSCSs which will have to deposit either Rs. 1 crore or 1% of their net profit.
- In order to make the governance of these societies more democratic, transparent and accountable, the Bill has provisions for appointing a Cooperative Information Officer and a Cooperative Ombudsman.
- To promote equity and inclusiveness, provisions relating to the representation of women and SC/STmembers on MSCS boards have been included.
- The Bill makes only members eligible to be elected to the board or as office bearers of the cooperative society.
- The Bill also increases the penalty amount for violation of the law to Rs. 1 lakh and potential imprisonment from six months to a year.

"Cooperation is a great medium for the self-sufficiency of the village, it has the energy of Atmanirbhar Bharat."

- Prime Minister Narendra Modi

The word Cooperation' signifies team trusteeship and elucidates two terminoloqical assertions - *saha* and *karya*, meaning working together. Cooperatives are grassroots institutions with democratic governance formed for the common interests of society. It is aimed at the socio-economic upliftment of the community and providing a market for their products. This is truly a model based on **cooperation, collective gain, and building social capital**.

Despite the fact that these cooperatives have operated and sustained since their inception more than a century ago, the overall picture was not particularly appealing.
On 6 July 2021, when a separate 'Ministry of Cooperation' (MoC) was created by the Union Government with the purpose of attaining the goal of 'Sahakar se Samriddhi, it was a historic decision to further develop cooperatives as a true people-based movement reaching up to the grassroots.

The PM's clarion call - Sahakar se Samriddhi had emphasised on sharpening the means as well as the goals of the government, offering a clear message of cooperation as a tool to achieve economic freedom, self-reliance and social justice, through community-led and community-owned entrepreneurial exertions.

- **Strengthening Primary Agriculture Credit Societies (PACS)**:
    - **Model By-laws for PACS:** 22 states have adopted model-by-laws to enhance operational efficiency, transparency, and responsibility towards collective community development.
    - **PACS as Common Service Centres (CSC):** PACS can register as CSCs to diversify their business for self-sustenance.
    - **Integrating PACS with FPOs:** This will help PACS to extend their scope of activities and take up high-income enterprises like beekeeping, mushroom cultivation, etc.

    - **PACS in the Oil and Energy Business:** PACS can avail licenses for petrol and diesel dealerships and LPG distributorships, and they will also be engaged in the implementation of various renewable energy schemes.
- **National Cooperative University:** It will help to establish a comprehensive, integrated, and standardized structure of cooperative teaching and training and meet the demand for capacity building of the existing workforce.
- **Cooperative database:** The Ministry of Cooperation is developing a comprehensive cooperative database to capture authentic and updated data on cooperatives of all sectors to support policy formulation.
- **Other initiatives:**
    - Computerization of 63,000 functional primary agricultural credit societies.
    - Cooperative societies as registered buyers and sellers on the Government e-market platform (GeM).
    - Setting up the National Export Cooperative Society to promote exports from cooperatives.
    - Establishing a national organics cooperative society to promote organic products.
    - Setting up the National Export Seed Cooperative Society to promote production preservation certification and distribution of quality seeds.
    - Creating 2 lakh new multi-purpose PACs to cover all 2.54 lakh panchayats.

Recent measures have been seen as concrete steps toward further strengthening the cooperative sector.

- The 'World's Largest Grain Storage Plan' in the Cooperative Sector is in the pipeline through the convergence of various schemes.
- The decision to form three multi-state cooperative societies for Seed, Organic, and Export will provide fresh momentum to the cooperative sector.
- Also, plans to establish viable PCS in each uncovered panchayat, viable dairy cooperatives in each uncovered panchayat/village and fishery cooperatives in each coastal panchayat/village as well as panchayat/village having large water bodies have been formulated
- There are plans for reinforcing existing PACS/dairy/fishery cooperatives through the convergence of various schemes of Ministry of Fisheries, Animal Husbandry & Dairying by leveraging the 'Whole-of-Government' approach.

India has a rich history of cooperatives and is home to 8.54 lakh cooperatives of which 80% are non-credit cooperatives, and 20% are credit cooperatives. Today, cooperatives have a presence in 98% of villages, with 29 crore members.

The potential of cooperatives in promoting inclusive growth and social welfare is significant and can be seen in the following ways:

- **Employment Generation:** Cooperatives can create employment opportunities in areas where traditional employment opportunities are limited. Cooperatives provide jobs for their

members and their families, and often employ people from disadvantaged communities, women, and youth.

- **Poverty Reduction:** Cooperatives can contribute to poverty reduction by providing members with access to credit, training, and other resources that enable them to start or expand their own businesses. Cooperatives can also provide affordable goods and services to their members, such as healthcare, housing, and education.
- **Social Welfare:** Cooperatives promote social welfare by providing members with a sense of community and belonging. Members work together to achieve common goals and share the benefits of their collective efforts. Cooperatives also promote social responsibility by supporting community development projects and by practicing ethical and sustainable business practices.
- **Financial Inclusion:** Cooperatives can provide financial services to people who are excluded from the formal banking system. Cooperatives offer a range of financial services, including savings, loans, and insurance, that enable members to meet their financial needs and build assets over time.
- **Empowerment:** Cooperatives empower members by giving them a voice in decision-making and by promoting democratic control. Members have equal voting rights and participate in the management of the cooperative, which enhances their leadership skills and promotes civic engagement.

Creating a sustainable and transparent cooperative system in India faces several challenges, including:

- **Weak regulatory framework:** The regulatory framework for cooperatives in India is weak and outdated. This makes it difficult to monitor and enforce compliance with regulations, and leaves room forS fraud and mismanagement.
- **Lack of transparency:** Many cooperatives in India suffer from a lack of transparency in their operations and management. This makes it difficult for members to hold their leaders accountable and can lead to corruption and abuse of power.
- **Limited access to capital:** Cooperatives often struggle to raise capital due to limited access to financial institutions and a lack of collateral. This makes it difficult for them to invest in new projects and expand their operations.
- **Political interference:** Many cooperatives in India are influenced by political parties, which can undermine their autonomy and lead to corruption.
- **Inadequate training and education:** Many members and leaders of cooperatives lack the necessary training and education to manage their organizations effectively. This can lead to mismanagement and a lack of accountability.

Source: *Yojana*

Strategic diversification of cooperatives and business competitiveness

The Need

1. To look beyond primary customers and markets and explore potential markets
2. To identify customers whose needs are not fulfilled yet
3. To sustain profitability in the long run
4. To generate Fund for functioning
5. To enhance capacity with RaD, new product development etc.
6. To remain relevant and competitive

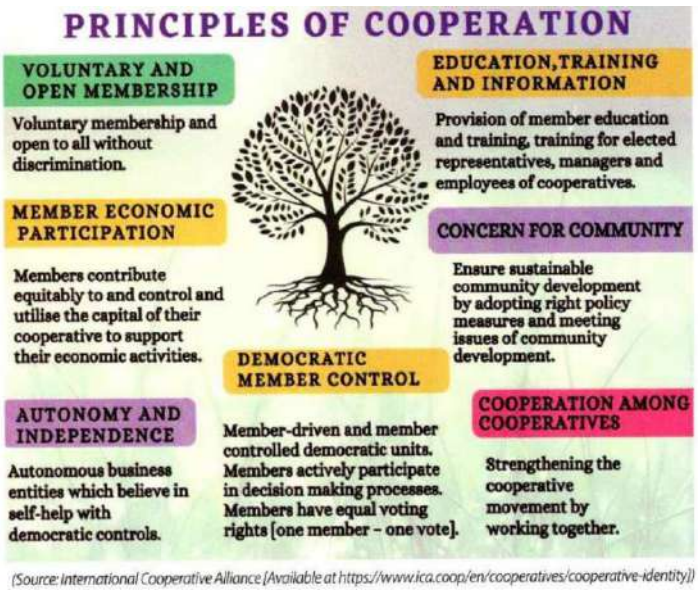
Types of diversification cooperatives can incorporate:

Types	Ways of diversification	Example
Product Diversification	Diversify products and services to meet new market needs or change customer preferences.	Amul introduced ice creams and other frozen milk confectionaries.
Geographic diversification	Diversify product offerings to reach new markets and satisfy customer needs.	Karnataka Milk Federation's milk brand 'Nandini Goodlife' is available across various states.

Service diversification	Offer additional services alongside primary products and services.	Anjarakandi Urban Cooperative Bank in Kerala sells coconut-based products in addition to banking services.
Joint ventures	Cooperatives can form joint ventures to combine resources and expertise	IFFCO and Spain's Congelados De Navarra have a joint venture to set up a food processing unit in Punjab.
Vertical integration	Cooperatives can vertically integrate by adding upstream or downstream activities.	Amerli District Cooperative Milk Producers Union and IFFCO Kisan Sanchar have a joint venture for high-quality animal feed supply.
Horizontal integration	Cooperatives can horizontally integrate by merging or acquiring other cooperatives or companies for economies of scale.	Centrum Finance Ltd acquired Punjab and Maharashtra Cooperative Bank to expand their market.

Advantages of Strategic Diversification for Cooperatives

- Achieve growth and competitive advantage in new markets and product lines by leveraging the unique strengths and capabilities of cooperatives.
- Expand customer base and reduce reliance on specific markets.
- By aligning diversification opportunities with their mission and values, cooperatives can better serve their members' needs.
- It allows cooperatives to develop advantageous positions in the market compared with corporates.
- Through strategic diversification, they can generate business profits while promoting inclusiveness in their activities.



(Source: International Cooperative Alliance [Available at https://www.ica.coop/en/cooperatives/cooperative-identity])

Source: *Yojana*

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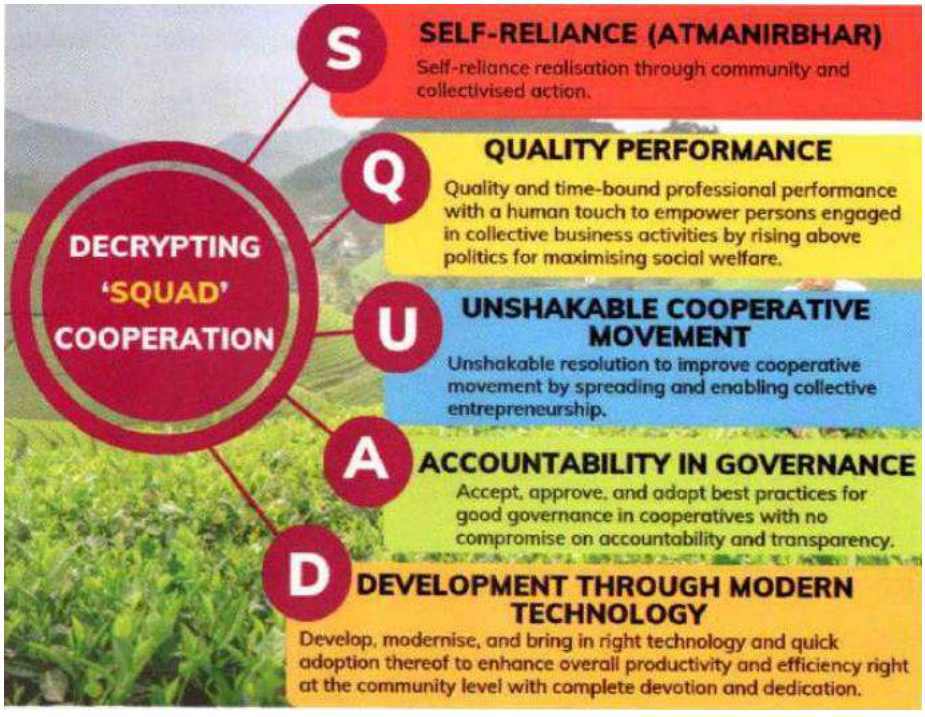
Addressing hurdles and challenges through appropriate policies and effective government interventions is necessary to unleash the full potential of cooperatives. This can be achieved by utilizing the 4 Ps and 4 Es framework.



Source: *Yojana*

Cooperative 'SQUAD': ***The government has formulated a plan which prioritizes and explores new emerging areas for cooperatives through the 'SQUAD' framework.***

Empowering Cooperative Credit Institutions through Technology

To make the dream of 'Sahakar se Samriddhi' a reality, Primary Agricultural Credit Societies (PACS) must be strengthened. The Ministry of Civil Aviation, under the leadership of the Prime Minister of India announced the liberalised Drone Rules 2021 with a vision to make India a global drone hub by 2030.

- The Ministry of Civil Aviation announced the liberalised Drone Rules 2021.
- The rules aim to make India a global drone hub by 2030.
- Easier and faster approvals for drone operations in India.
- Creation of a drone promotion council to facilitate a regulatory environment for the drone industry.

In order to boost the manufacturing of drones in India, the Central Government approved Production-Linked Incentive (PLI) scheme for drones and components worth Rs 120 crore and putting import bans, paving the way for the domestic manufacturing sector.

Indian Government's Initiatives:

- **Strengthening Primary Agricultural Credit Societies (PACS):**
  - Financial assistance and training are being provided to strengthen PACS.
  - This will enhance services to farmers and promote rural development.
- **Production-Linked Incentive (PLI) Scheme:**
  - The Central Government approved a PLI scheme worth Rs 120 crore for drones and components.
  - Aims to boost drone manufacturing in India and reduce import dependence.
- **Strengthening Cooperative Movement:** The government is giving increasing focus to strengthen the cooperative movement nationwide.

Applications of drones in agriculture –

- **Cost of application** – As per WEF, drone usage could reduce the cost of application by 20% and mitigate health hazards of manual work.
- **Precision agriculture** – It is also useful in promoting precision agriculture, thereby optimizing input use.
- **Productivity** – Precision agriculture know-how and farm advisory services based on data sources can enable 15% increase in productivity.
- **Evidence-based planning –** Drones enable data collection and resource-efficient nutrient application which facilitates crop production forecast, and evidence-based planning.
- **Emerging technologies –** Drones can be an effective enabler for mainstreaming emerging technologies such as yield estimation or insurance.
- **Aid in government initiatives** – With drones, government initiatives like Per Drop More Crop will improve and water use inefficiency in irrigation will decline.
- **Drones' data integrated with GIS and Google Earth satellite images** will streamline schemes like PMFBY by aiding crop cutting experiments, crop-loss estimation, insurance determination and dispute resolution.

- **Agri-research** – With drones, agri-research will become highly customized and localized.
- **Better pricing –** Since drones can capture backward and forward linkages, food processing industries will procure from farmers at better prices.
- World Economic Forum (WEF), in its latest report, stated that drones have the potential to be the **indicator of technology-led transformation of Indian agriculture**.

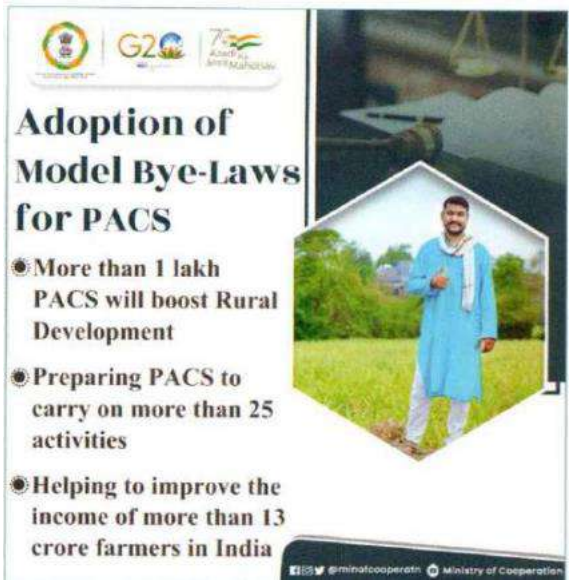
What role do drones play in addressing the challenges?

- The term drone, sometimes referred to as unmanned aerial vehicles (UAVs) refers to any aerial vehicle that receives remote commands from a pilot or relies on software for autonomous flight.
- Many drones display features like cameras for collecting visual data and propellers for stabilizing their flight patterns.

Technological adoption and process digitisation can empower cooperative institutions.

- **Digitization of STCCS:**
    - Centralized Online Real-time Exchange (CORE) based Banking Solutions (CBS) have automated State Cooperative Banks (StBs) and District Central Cooperative Banks (DCCBs), improving regulatory mechanisms and enabling anytime, anywhere banking.
    - Efficiency and governance across cooperative banks can be improved by adopting standardized technology-driven office management systems.
- **Technology Adoption for PACS:**
    - While DCCBs require the digitization of business processes, PACS need to be computerized as a fundamental step towards efficiency.
    - The computerization of PACS aims to enhance service delivery, digitize operations, and integrate them with DCCBs and StBs.
    - However, challenges such as inadequate rural infrastructure, power supply, internet connectivity, and computer skills must be addressed.
- **Technology Adoption for Customer Interface, Service Delivery, and Decision Making:**
    - Need to adopt technologies such as mobile banking, internet banking, drones for field monitoring, and blockchain for cybersecurity and transparency.
    - Need for collaborative partnerships with fintech firms to facilitate customer acquisition, credit profiling, advisory services, financial products, and development of user-friendly digital interfaces

Digitization holds immense potential for empowering cooperative credit institutions and driving rural development. With the right policy support and a focused approach, cooperative credit institutions can leverage digitization to effectively address the evolving needs of Indian agriculture, contributing to the prosperity of rural communities.



Source: *Yojana*

Geospatial Mapping of the Cooperatives

Recently, a national database on cooperatives has been initiated by the Ministry of Cooperation for single-point access to information on cooperatives of different sectors and to develop a process for a better understanding of cooperatives.

Key Highlights:

- In the first phase of development of the National Cooperative Database, data collection of cooperatives of three sectors – primary agricultural credit societies, dairy, and fisheries – is being taken up.
- Maharashtra has the highest number of cooperative societies, followed by Uttar Pradesh.

About Geospatial data Infrastructure:

- A Spatial Data Infrastructure, also called geospatial data infrastructure, is a data infrastructure implementing a framework of geographic data, metadata, users and tools that are interactively connected in order to use spatial data in an efficient and flexible way.

Report of the Geospatial Infrastructure in India:

- National Geospatial Policy 2022 provides the framework to develop geospatial infrastructure, skills and knowledge, standards and businesses.
- By 2030, the government will look to establish an Integrated Data and Information Framework, under which a Geospatial Knowledge Infrastructure will be developed.
- A high-resolution topographical survey and mapping as well as a high-accuracy Digital Elevation Model for the entire country will be developed by 2035.
- The national database for cooperatives needs to have geospatial database creation with geo-referencing of cooperative societies to make a decision-support model.

Significance of Geospatial Mapping of Cooperative Societies:

- **Understanding of the Heterogeneity and Diversity**: The cooperative movement is all set for acceleration of membership.
    - The plan of acceleration requires an understanding of the heterogeneity and diversity in spatial distribution.
- **Analyzing the Polarisation of Cooperatives:** The distribution of cooperative societies reflects polarization of societies in a few States in the west and south while the number of cooperative societies in the east and northern parts is low.
    - Geospatial mapping of these cooperatives will help to analyze the reason for such polarization.
- **District-wise mapping of cooperatives:** District-wise mapping of cooperatives along with database collection is essential to provide a more precise picture of cooperatives at the State and national levels.
    - The advanced geospatial tools and technologies will help in predicting, analyzing, modelling, and visualizing spatially explicit information.
- ***Understanding the Contrasting Diversities:*** Some contrasts are seen like nil dairy cooperatives in the North-East States of Manipur, Nagaland, Mizoram, Meghalaya, while Sikkim is better positioned.
- ***Fisheries cooperatives*** are also formed around inland water resources in contrast to coastal lines in the western and eastern parts of the country.
- It is essential to map these contrasting diversities and analyze the reasons, which could be the resource base of the State.
- It is essential to undertake research on the major parameters that contribute to the development of such societies and their distribution in specific regions.

Way Forward:

- Thematic GIS mapping along with research and analysis of the distribution of cooperative societies is to be committed towards addressing the developmental issues at the grassroots level.
- The proposed database shall facilitate all stakeholders in policy-making and implementation to strengthen the cooperative movement in the country.

The geospatial mapping of the cooperative ecosystem will generate ease of doing business outcomes and the potential to be utilized to conduct in-depth mapping and analysis which will be of immense help to planners, managers and administrators in quickly storing, retrieving and updating the required information for the management of cooperatives.

Types	Ways of Diversification	
Product Diversification	Cooperatives can diversify their product/service offerings to meet the needs of new markets or due to change in customer tastes and preferences. For example, Amul – one of India's largest and most successful dairy cooperatives, introduced ice creams and other frozen milk confectionaries in 1996, to spread its businesses.	
Geographic Diversification	Cooperatives diversify their product offerings to reach new markets and customers to satisfy their needs. For example, 'Nandini Goodlife', a milk brand owned by the Karnataka Milk Federation, has been made available across various states in India in leading retailers as part of the strategic objectives of the entity to make its presence felt in various parts of the country.	
Service Diversification	Cooperatives offer new services, apart from their primary products and services, to meet the needs of their members and customers. For example, the Anjarakandi Urban Cooperative Bank in Kerela, apart from their primary products and services based on banking, sells coconut-based products such as copra, coconut water/milk/oil.	
Joint Ventures	Cooperatives can form Joint Ventures (JVs) to pool resources and expertise. For example, a cooperative that produces agricultural products could constitute a joint venture with a technology company to develop new precision farming technologies. Indian Farmers Fertiliser Cooperative Limited (IFFCO) – a fertiliser-producing cooperative, formed a JV with Spain's Congelados De Navarra to set up a food processing plant at Ludhiana in Punjab.	
Vertical Integration	Cooperatives can vertically integrate by including upstream or downstream activities from their current operations. For example, a dairy cooperative could start producing animal feed. It can be seen in JVs such as the Amreli District Cooperative Milk Producers Union entering into a JV with IFFCO Kisan Sanchar for the supply of high-quality animal feed.	
Horizontal Integration	Cooperatives can horizontally integrate their operations by merging with or acquiring other cooperatives or companies operating in the same industry, which can result in the achievement of significant economies of scale giving various benefits to their customers and stakeholders. For example, the Mumbai based Non-Bank Finance Company (NBFC) firm, Centrum Finance Ltd. acquired the Punjab and Maharashtra Cooperative Bank, to tap into the markets covered by the Bank.	

Source: *Yojana*

Regenerative Agri-Supply Chain management

The focus of agriculture cooperatives has transformed from production to quality produce in addition to marketing and processing. Cooperative Marketing Societies have been progressing towards better storage facilities, efficient management of resources, timely payments to farmers, and minimization of waste.

- Effective grading, sorting, and handling of agricultural commodities can help create an efficient supply chain.
- Cooperatives in regenerative supply chains are taking care of the climate, social and environmental justice by going beyond profit maximization.

Agriculture Supply Chain Management (ASCM)

- **Supply chains** concern themselves with the flow of products and information amongst the members of the supply chain organisations.

- This entails the procurement and transformation of materials into final finished products, and the distribution of those products to end customers.
- The supply chain is the series of the flows of agricultural commodities from producer to consumer following the sequence of logistics flows, transporters, stores, procurement, warehousing, inventory management, and processing.
- Focusses on efficient planning, design, coordination, organization, storage, processing, and monitoring of the flow of agricultural commodities from farm to fork.

However, these supply chains are often challenged by various factors such as climate change, market volatility, market price rate, and supply chain disruptions. The transformation towards a climate-smart regenerative agriculture supply chain will suppress the social and environmental pressures on agriculture.

Role of Cooperatives in Agriculture Supply Chain:

- Help the agricultural supply chain by **offering technical, financial, and operational support services**.
- Farmer Producer Organizations (FPOs) are **responsible for business activities** such as bulk purchasing of agricultural inputs, and facilitating credit requirements.
- Serve as a **platform** for information transmission, marketing, transportation, and distribution of commodities.
- Help to **get quality produce** by supplying agri input (seeds, fertilisers, etc.) and **extending credit facilities**. Their **focus has shifted to quality produce in addition to marketing and processing.**
- Cooperative marketing societies have **progressed towards better storage facilities, efficient management of resources, timely payment to farmers and minimisation of waste.**
- T**ransformed to regenerative supply chains** by adopting sustainable practices.

Primary Agricultural Credit Society (PACS) Storage & Supply Chain Management:

- **Multi-service centres:** Primary Agricultural Credit Society (PACS) act as multi-service centres that assist the farmers in procuring and marketing of agricultural produce along with meeting the credit requirements.
- **Quality inputs for farmers:** The storage of agriculture implements, and agri-inputs by PACS can help ensure availability of quality inputs for farmers.
- **Common service centers:** PACS are functioning as common service centres by facilitating the delivery of services to villages.

Figure 1: Managing Supply Chain through Cooperatives

Source: Yojana

The Ministry of Cooperation has set up of three sector-specific national-level cooperative societies:

- **Seed societies:** helps with seed production, processing, storage, and distribution
- **Export societies:** helps in procurement, storage, processing, marketing, branding, packaging
- **Organic societies:** offers certification and standardization to the market via laboratory networks

The transformation towards a regenerative supply chain has provided cooperatives with economic, social, and environmental benefits. Antecedents like institutional support, organisational restructuring, network and symbiosis, training, technical knowhow, agri-input facilities, knowledge dissemination. Adequate infrastructure, quality storage, capacity building, training, promotional activities, market awareness, data analytics, and monitoring will help in the transformation towards better supply chain management by cooperatives. Industrial symbiosis and supply chain networks among cooperatives have also helped in a regenerating supply chains and overall cooperative development.

Expansion of knowledge on the by-products and their use need to be explored.
Agriculture supply chain management by cooperatives depends upon how well the members are sensitised abou the recent advances in the supply chain and their applications towards effective management.

World's largest grain storage plan:

The Union Cabinet has approved the formation of the Inter-Ministerial Committee (IMC) to develop the world's largest cooperative grain storage plan.

- The plan is multi-pronged - it aims to address not just the shortage of agricultural storage infrastructure in the country by facilitating the establishment of godown at the level of PACS, but would also enable PACS to undertake various other activities, viz:

- Functioning as Procurement centres for State Agencies/ Food Corporation of India (FCI):
- Serving as Fair Price Shops (FPS),
- Setting up custom hiring centres;
- Setting up common psocessing units, including assaying. sorting grading units for agricultural produce, etc.

- Further, creation of decentralised storage capacity at the local level would reduce food grain wastage and strengthening food security of the country.
- By providing various options to the farmers, it would prevent distress sale of crops thus enabling the farmers to realise better prices for their produce.
- It would hugely reduce the cost incurred in transportation of food grains to procurement centres and again transporting the stocks back from warehouses to FPS.
- Through Whole-of-Government' approach. the Plan would strengthen PACS by enabling them to diversify their business activities, thus enhancing the incomes of the armer members as well.

Fishery Cooperatives

The Fisheries sector [Sunrise Sector] is quite diverse with sub-sectors like marine, inland, and brackish water, besides cold water and ornamental fisheries. With the establishment of the Ministry of Cooperation, the momentum for the fishery cooperative movement in the country picked up in 2021 and since then, they have received priority attention and real focus.

- The role of fishery cooperatives must be considered at every level in the changed economic scenario, and they should be supported with funds to develop infrastructures and a progressive supply and value chain for sustainability.
- Fishery cooperatives can provide livelihood security, nutritional security, and social security to vulnerable groups in society.
- Around 4 million people are economically benefited through primary fishery cooperatives in India.

The Government of India is committed to uplift the fishery cooperative sector through adequate policy and financial support.

- The sector has immense economic potential in India, with a coastline of over 8,000 km, an exclusive economic zone of over 2 million square km, and extensive freshwater bodies.
- It provides livelihoods to more than 2.8 crore fishers and fish-breadth of the nation
- India is endowed with bounties of water fish-producing country in the world, contributing resources in both the marine and inland sectors 7.93% towards global fish production, and is the second largest among the aquaculture including brackish and cold water, and it boasts a significant population of skilled manpower.

Fishery Development: Government of India's Thrust:

- **Atmanirbhar Bharat Abhiyaan**: The Prime Minister announced a Rs 20 lakh crore economic package to create jobs in the fisheries sector.
- **The Pradhan Mantri Matsya Sampada Yojana (PMMSY):** Launched in 2019-20 with a total project outlay of Rs 20,050 crore to boost India's economy through the fisheries sector. Know more about the Pradhan Mantri Matsya Sampada Yojana in the link.
- **Fisheries & Aquaculture Infrastructure Development Fund (FIDF):** A dedicated fund of Rs 7,522 crore was established to develop fisheries and aquaculture infrastructure.
- **Blue Revolution:** Introduced in 2014, it promotes fish production and infrastructure development in the fisheries sector. Read more about the blue revolution in the link.

Fishery Cooperative Movement in India:

- Began as early as 1913 when the first fishermen's society was organised under the name of the '**Karla Machhimar Cooperative Society'** in Maharashtra.
- Since the establishment of the Ministry of Cooperation, fisheries cooperatives have been receiving priority attention and real focus.

National Database of Fisheries Cooperatives:

- A decision has been taken to organise fishery cooperatives covering each panchayat of the country to reach a figure of 2 lakhs in the coming five years.
- The National Fisheries Development Board (NFDB) and FISHCOPFED have been assigned to speed up the work in coordination with the concerned State/UT authorities.
- The database can help identify the gaps in the sector, and efforts will be made to bridge the gaps.

Fishery cooperatives have received priority attention and real focus since the establishment of the Ministry of Cooperation in 2021. The government of India is committed to uplifting the fishery cooperative sector through adequate policy and financial support.

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SUSTAINABLE AGRICULTURE DEVELOPMENT

Agriculture is the backbone of the Indian economy, employing more than half of the country's population. On the other hand, traditional agricultural practices in India are frequently unsustainable and can negatively affect the environment and human health. Sustainable agricultural practices are required to ensure the long-term viability of agriculture in India.

- While the industry and services sectors contribute more than 80% of the gross value added in the country, they employ 54.4% of the workforce.
- Agriculture, which accounted for 18.29% of VA in 2019-20, still employs 45.6% of the workforce, indicating that a significant portion of the Indian population relies on agriculture for their livelihoods.

However, over the years, the percentage of the population employed in agriculture has gradually declined as the country has diversified its economy and developed other sectors, such as services and manufacturing. In 2000, the percentage of the population employed in agriculture was 60.5%, showing a significant shift away from agriculture in recent years.

Farmers can develop sustainable farming systems that promote environmental, social, and economic sustainability by adopting advanced technologies. However, it is essential to note that technology is not a silver bullet and must be implemented with other sustainable farming practices, such as soil conservation, crop rotation, and integrated pest management, to achieve sustainable farming systems.

Sustainable agriculture is a farming method that considers the soil, the environment, and the community's long- term health. It is critical to meet rising food demand while protecting natural resources for future generations. As the world has become more aware of the importance of environmental preservation, sustainable agriculture has received significant attention in recent years. Sustainable agriculture produces food, fibre, or other plant or animal products while preserving the environment, public health, human communities, and animal welfare. Natural resources such as soil, water, and air are conserved and regenerated for future generations through these practices.

As a developing country, India is vital in achieving sustainable agriculture globally. Agriculture provides a living for more than 58% of India's population. The country has made significant strides in increasing agricultural output, but much more work remains to achieve sustainable agricultural practices. One of the most significant challenges confronting Indian farmers is declining soil fertility due to the excessive use of chemical fertilisers, pesticides, and intensive farming practices.

Adopting sustainable agriculture practices in India is critical for the long-term sustainability of the agriculture sector.

- The Indian Government and various organisations have launched several initiatives to promote sustainable agriculture practices. For example, the government launched the National Food Security Mission, the Pradhan Mantri Fasal Bima Yojana, and the Soil Health Card Scheme to improve agricultural practices and financially assist farmers.

- Adopting technologies can be crucial in developing sustainable farming systems that promote environmental, social, and economic sustainability.

Apart from these principles, Sustainable agriculture practices are based on three basic pillars:

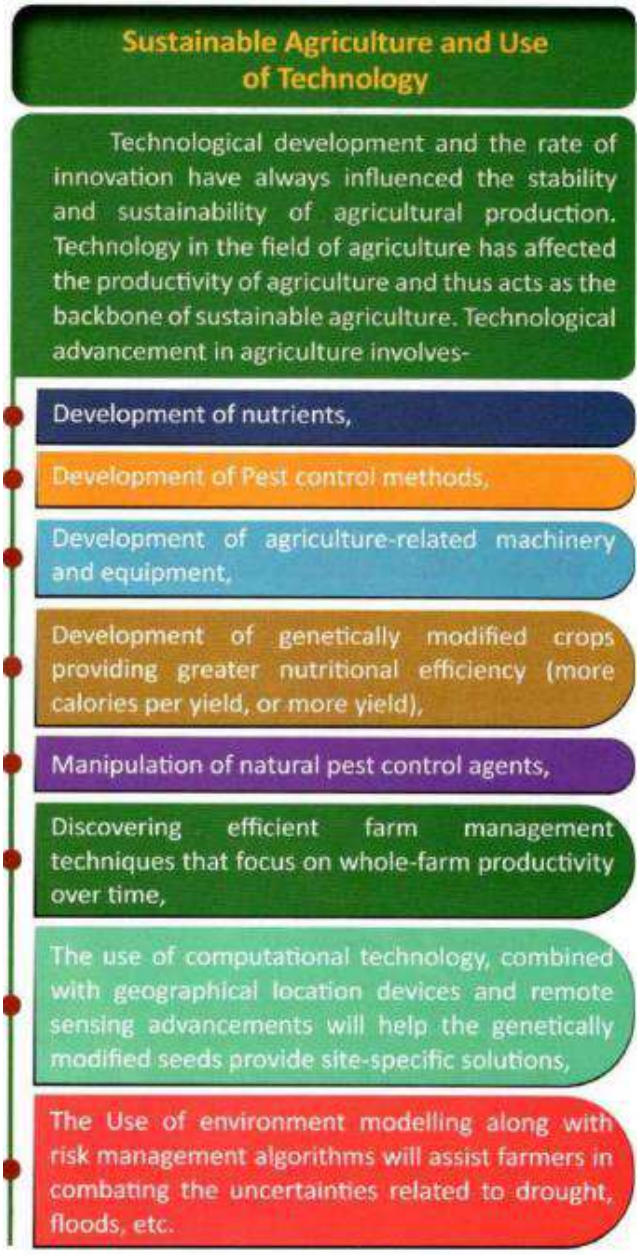
- **Economy:** This ensures the growth and profitability of the business for the farmers through the efficient use of viable resources.
- **Society:** This pillar ensures enough food for the world's growing population and fair employment and compensation opportunities for the local community.
- **Environment:** This pillar ensures the environment's protection through ecologically sound farming practices and less use of replenishable resources.

Here are some ways in which technology can help in sustainable farming:

- **Precision Farming:** It involves sensors, GPS mapping, and data analytics to monitor and optimise crop performance. By using precision farming techniques, farmers can reduce the use of fertilisers and pesticides, improve water management, and increase yields. Precision farming is a relatively new concept in India, and its adoption varies by state depending on various factors such as the availability of technology, agricultural practices, and Government policies.
- **Agroforestry:** Agroforestry is a land-use integrated management system that combines trees and shrubs with crops and livestock to create a more sustainable and productive farming system. This approach can provide various benefits, including soil conservation, biodiversity conservation, and carbon sequestration.
- **Vertical Farming:** It cultivates crops in stacked layers, usually under controlled conditions. Vertical farming can potentially increase local food production while reducing water consumption and optimising resource utilisation, making it an appealing option for Indian urban agriculture. This method can reduce the need for pesticides and herbicides while increasing crop yields and lowering transportation costs.
- **Hydroponics:** Hydroponics is gaining traction in various Indian states as a sustainable farming method that allows for efficient water and nutrient use, year-round cultivation, and

reduced dependence on traditional agricultural practices. Hydroponics involves growing plants in nutrient- rich water without soil. This approach can reduce water use, increase yields, and allow for year-round crop production. It can potentially revolutionise how we grow food in India, especially in urban areas with limited space and resources.

- **Renewable Energy-based:** Renewable energy technologies, such as solar and wind power, can be used to power farming operations. This approach can reduce greenhouse gas emissions and dependence on fossil fuels.
- **Robotics and Automation-based:** Robotics and automation technologies can help reduce labour costs, improve crop yields, and reduce the use of fertilisers and pesticides.



Gaps Identified in Adopting Sustainable Agriculture Development

1. Lack of Awareness and Knowledge: Many farmers don't know the benefits of sustainable agriculture practices or how to implement them effectively.

2. Limited Access to Finance: Sustainable agriculture practices often require significant infrastructure and technology investments. However, many tiny and marginal farmers need more access to finance to make these investments.

3. Inadequate Policy and Regulatory Framework: Adopting sustainable agriculture practices is not always supported by India's policy, and the regulatory framework does not always support adopting sustainable agriculture practices. For example, farmers may need more incentives to adopt sustainable practices, or regulations may prohibit certain sustainable practices. The National Mission for Sustainable Agriculture receives only 0.8% of the Ministry of Agriculture and Farmers Welfare (MoAFW) budget, indicating a significant opportunity to support sustainable agriculture further.

4. Limited Research and Development: There is a need for more research and development in sustainable agriculture practices that are appropriate for the Indian context. There is also a need for more investment in disseminating research findings and developing extension services to help farmers adopt these practices.

5. Lack of Infrastructure and Technical Support: Adopting sustainable agriculture practices often requires significant infrastructure and technical support. However, many farmers need access to these resources, particularly in remote rural areas.

6. Low Productivity: Agriculture in India is characterized by low productivity, a significant impediment to its growth and development. The yield per hectare for most crops in India is significantly lower than the global average, and several factors contribute to this, such as low levels of mechanisation, inadequate irrigation facilities, and poor soil health.

7. Fragmented Landholdings: The average landholding size in India is small, which makes it difficult for farmers to adopt modern farming techniques and technologies. Fragmented landholdings also make it difficult for farmers to access credit and other support services.

8. Lack of Market Access: The lack of access to markets is a significant challenge for farmers in India, tiny and marginal farmers. Many farmers are forced to sell their produce to intermediaries at low prices, as they cannot access direct markets. This results in lower incomes for farmers and higher food prices for consumers.

9. Inadequate Infrastructure: Inadequate infrastructure, such as rural roads, storage facilities, and cold chains, is a significant challenge for the agriculture sector in India. This makes it difficult for farmers to transport their produce to markets, store it safely, and sell it later.

10. Climate Change: Climate change poses significant challenges to the agriculture sector in India, particularly in terms of water availability, pest and disease management, and crop yields. The

changing weather patterns, including erratic rainfall and rising temperatures, affect crop productivity and increase farmers' vulnerability.

11. Gender Inequality: Women are particularly susceptible. The Global Food Security Index (GFS) score for sustainability and adaptation decreases as gender inequality increases. The GFSI demonstrates that a lack of access to fresh, clean water and land resources and a lack of political commitment to adaptation and sustainable agricultural practices are all factors associated with gender inequality.

Identifying numerous additional gaps in India's agricultural sector presents severe obstacles to developing a resilient and sustainable agriculture sector. A multifaceted approach will be necessary to close these gaps, necessitating investments in R&D, regulatory and policy reforms, and creating infrastructure and extension services to encourage adopting sustainable agricultural practices.

India has had a National Mission for Sustainable Agriculture (NMSA) to promote sustainable agriculture since 2014-15. It is divided into several programmes focusing on agroforestry, rainfed areas, water and soil health management, climate impacts, and adaptation.

Aside from NSA, the Pradhan Mantri Krishi Sinchayee Yojana encourages precision farming techniques like micro- irrigation, and the Integrated Watershed Management Programme encourages rainwater harvesting.

Key Recommendations for Successful Adoption

The Way Forward

- **The Government and various organisations must collaborate** to promote and implement sustainable agriculture practices in the country.
- **Adoption of sustainable farming systems**: Farmers in India have adopted various sustainable agricultural practices to ensure agriculture's long-term sustainability.
    - **Crop rotation** involves alternating crops in a specific field over time. This practice promotes soil health and fertility while decreasing the likelihood of pest infestations and diseases.
    - **Organic farming** methods are another sustainable agricultural practice. To produce crops without synthetic chemicals, organic farming relies on natural processes and techniques such as crop rotation, intercropping, and natural fertilisers. Organic farming has numerous advantages, including producing healthy and nutritious food, reducing soil erosion, and water resource conservation.

Sustainable agriculture practices have the potential to boost agricultural productivity, reduce production costs, and enhance the quality of crops. It may also promote the production of healthier and safer foods, which is beneficial to public health.

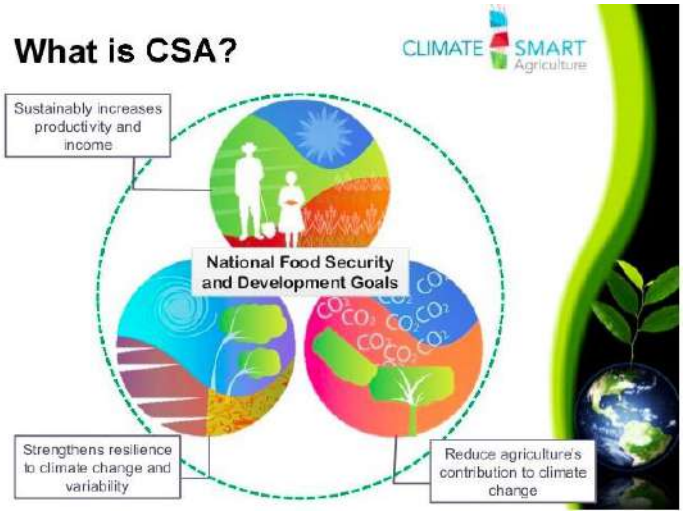
Climate-Smart Agriculture (CA)

As defined by the World Bank, 'Climate-smart agriculture (CA) is an integrated approach to managing landscapes-cropland, livestock forests and fisheries, that address the interlinked challenges of food security and climate change.' A range of agricultural practices that transform agricultural systems to support food security in the face of climate change have been collectively known by the name CSA. Basically, the CSA targets three outcomes simultaneously:

Increased productivity: A 2020 World Bank report found that nearly 690 million people-or 8.9 per cent of the global population – are hungry, up by nearly 60 million from 2015 onwards. Saving this population from hunger in the first place and providing them with the necessary nutrition are the two major dimensions of; increasing the productivity of agricultural produce.

Enhanced resilience: Developing crops that could sustain extreme weather conditions like drought, flooding, etc., and sustain against pests, diseases, and other climate-related risks and shocks; and improve capacity to adapt and grow in the face of longer-term stresses like shortened seasons and erratic weather patterns are the major objectives under enhancing resilience.

Reduced emissions: As discussed in the above section, agriculture is responsible for global warming on a large scale. So, for climate-smart agriculture, it is imperative to find ways to reduce emissions for each kilo of food produced, avoid deforestation, and identify ways to absorb carbon out of the atmosphere.



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The following factors are critical for both decarbonisation and sustainability:

Soil	• Fertile soil enhances farm yields and incomes apart from being a carbon sink. • Healthy soil holds more moisture and soil conservation methods reduce erosion. • The co-products of biogas/biofuels plants are compost/bio-char, which enrich soil, mitigate environment pollution, and displace chemical fertilisers
Freshwater	• Agriculture consumes over 80% of freshwater in India, making conservation critical. • Micro-irrigation with automation and adoption of low water-intensive species and farming practices is essential. • Areas under water intensive crops must be reduced through crops diversification, examples being oil seeds, pulses, horticulture, and forage crops.
Alternate cropping:	• This contributes to GHG mitigation and is an emerging area in climate-smart farming. • For example, seaweed cultivation as additive to cattle feed reduces biogenic methane emissions, improves feed quality, and enhances milk production
Agro-forestry:	• Trees act as windbreaks, reduce soil erosion, enrich soil, and filter water. • Studies suggest that 5% increase at 5 yearly intervals to the existing 16 mha area can help mitigate India's projected emissions.
Bio-energy from farm waste	• Manure-based community biogas plants can support clean cooking and distributed power.

	• India's National Policy for Biofuels/ SATAT scheme set a medium-term target of 15 million tonnes of bio-CNG. • BECCS (Bio Energy with Carbon Capture & Storage) involves capturing CO2 from bioenergy plants and permanent storage. This will lead to carbon removal as well as negative emissions.

Climate-Smart Crop Production Practices and Technologies

The Food and Agriculture Organization (FAO) says in its 2011 report that it is impossible to harvest good crops with bad seeds. Therefore, for the success of any climate-smart agriculture, it is very important to develop and follow smart management practices and technologies. These practices and technologies must be able to address the problems of production as well as emissions in agriculture. Most of these practices prevent soil damage that releases carbon and water into the atmosphere, promote soil wand, water conservation; and increase productivity. The Organization has laid down a fairly elaborative system of such practices and technologies to be followed by the countries for climate-smart crop production.

To mitigate the impending impact, the Government has taken many initiatives, some of which are as follows:

- **National Innovation on Climate Resilient Agriculture (NICRA):** This is a network project of the Indian Council of Agricultural Research (ICAR) launched in February 2011 with an outlay of Rs. 350 crore. The project aims to enhance the resilience of Indian agriculture, covering crops, livestock, and fisheries to climatic variability and climate change through the development and application of improved production and risk management technologies.
- **National Mission on Sustainable Agriculture (NMSA):** The Government is implementing the National Action Plan on Climate Change (NAPCC) which provides the overarching framework for climate actions, through national missions in specific areas. The NMSA works through the adoption of sustainable development pathways by progressively shifting to environment-friendly technologies, adoption of energy-efficient equipment conservation of natural resources, Integrated farming, etc. Besides, the NMSA aims at promoting location- specific improved agronomic practices through soil health management, enhanced water use efficiency, judicious use of chemicals, and crop diversification.
    - *The main objectives of the mission are-*
        - To make agriculture more productive, sustainable, remunerative, and climate resilient by promoting location-specific Integrated/Composite Farming Systems.
        - To adopt comprehensive soil health management practices based on soil fertility maps, soil test-based application of macro & micro nutrients, judicious use of fertilisers, etc.
        - To optimise utilisation of water resources through efficient water management to expand coverage for achieving 'More Crop Per Drop'

  - To develop capacity of farmers & stakeholders, in conjunction with other on-going Missions e.g. the National Mission on Agriculture Extension & Technology, the National Food Security Mission, the National Initiative for Climate Resilient Agriculture (NICRA), etc., in the domain of climate change adaptation and mitigation measures.
  - To pilot models in select blocks for improving the productivity of rainfed farming by mainstreaming rainfed technologies and by leveraging resources from other schemes/Missions like the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Integrated Watershed Management Programme (IMP), Rashtriya Krishi Vikas Yojana (RKVY), etc.

- **National Adaptation Fund for Climate Change (NAFCC):** It was established to meet the cost of adaptation to climate change for the State and Union Territories of India that are particularly vulnerable to the adverse effects of climate change. This Scheme was implemented during 2015-16 mainly for supporting concrete adaptation activities dealing with mitigating the adverse effects of global climate change in various sectors including agriculture. Under the NAFCC, various projects have been sanctioned in different states, i.e., Punjab, Himachal Pradesh, Odisha, Manipur, Tamil Nadu, Kerala, Mizoram, Chhattisgarh, J&K, Meghalaya, Telangana, Andhra Pradesh, etc.
- **Climate Smart Village (CSV):** It is an institutional approach to test, implement, modify, and promote CSA at the local level and to enhance farmers' abilities to adapt to climate change. CVs were piloted in two states of India: Karnal district of Haryana state and Vaishali district of Bihar state, which later spread into the districts of Punjab, Andra Pradesh, and Karnataka.
- **Paramparagat Krishi Vikas Yojna (PKVY):** It is an extended component of Soil Health Management (SHM) launched in 2015 under NSA with the objective of supporting and promoting organic farming through adoption of organic village by cluster approach, which in turn results in improvement of soil health.
- **Biotech-KISAN:** It is a scientist-farmer partnership scheme launched in 2017 for agriculture innovation with an objective to connect science laboratories with the farmers to find out innovative solutions and technologies to be applied at farm level. Under this scheme, so far 146 Biotech-KISAN Hubs have been established covering all 15 agroclimatic zones and 110 aspirational districts in the country.
- **Sub-Mission on Agro-forestry:** This Mission was launched during 2016-17 with the objective of planting trees on farm bunds. Agro-forestry has the potential to bring sustainability in agriculture and also achieve optimum productivity by mitigating the impact of climate change.
- **National Livestock Mission:** This Mission was initiated by the Ministry of Agriculture and Farmers' Welfare and got commenced from 2014-15 focusing mainly on livestock development through a sustainable approach ultimately protecting the natural environment, ensuring bio-security, conserving animal bio-diversity and farmers' livelihood.

- **National Water Mission (NWM):** A Mission was launched to ensure Integrated Water Resource Management (IRM) for conserving the water sources and minimising its wastage and tolloptimise Water Use Efficiency (WUE) by 20 per tent including agriculture sector.

The Way Forward

- Concepts such as Low External Input Sustainable Agriculture (LEISA), which seek to optimise the use of locally available resources replacing external inputs is receiving increased attention as a sustainable alternative to chemical farming.
- The Zero Budget Natural Farming (ZBNF) concept is a low-input, climate-resilient type of farming that encourages farmers to use low-cost locally sourced inputs. It eliminates the use of chemical fertilisers and pesticides.
- Farmers should make the shift to a package of practices that lower the use of water (through in-situ soil moisture conservation and other demand management measures), promote the use of bio-fertilisers and bio-pesticides as a means to reduce the cost of cultivation and lower the environmental footprint of cotton cultivation.
- A combination of tools and techniques covering capacity building, field demonstration, extension and outreach will enable faster adoption. A robust extension and knowledge sharing system in partnerships with the agriculture department, institutions and universities to scale the adoption of sustainable farm practices.
- Provide better market linkages so that farmers are able to get assured and higher returns for their produce.

Conclusion

From the powerful economies to the less-developed countries; from countries in Europe and Americas to island nations in the Pacific, the impacts of climate change are real and here to stay. Our efforts to combat climate change will have to focus on mitigation and adaption efforts across all sectors. For agrarian countries, the task will be to ensure increased production without increasing the environmental footprint of agriculture by enhancing the knowledge and skills of our farmers.

Organic Farming

What is organic Farming?

- As per the United States Department of Agriculture (USDA) organic farming is a system which largely excludes the use of synthetic inputs (fertilizers, pesticides, etc.) and relies upon crop rotations, crop residues, animal manures, organic waste, and biological system of nutrient mobilization.
- Organic farming system in India is not new and is being followed from ancient times.
- Currently India ranks 33rd in terms of total land under organic cultivation and 88th in terms of the ratio of agricultural land under organic crops to total farming area.

What are the principles adopted in Organic Farming in India?

- Organic agriculture grows and develops with these principles. These can contribute to improving organic agriculture for the world.
- There are four principles of organic farming are as follow:-
    - Principles of Health – The health of the ecosystem, people, and communities.
    - The Principles of Ecology – The right balance between ecosystem and environment or nature.
    - Principles of Fairness – Good human relationships and quality of life.
    - Principles of Care – The considerations about the environment and environment of the future.

Need of encouraging the use of organic farming in India:

- **Unsustainable conventional agriculture**: The ill effects of the conventional farming system are felt in India in terms of the unsustainability of agricultural production, environmental degradation, health and sanitation problems, etc. Organic agriculture is needed as an alternative method to the modern system.
- **Agricultural productivity:** The fertilizer and pesticide consumption has increased manifold but this trend has not been reflected in the crop productivity to that extent during green revolution.
    - Organic farming has the potential of increased productivity in the long term due to better soil conditions and ecosystems.
- **Rising population**: With the increase in population there is need to increase agriculture production further in sustainable manner. The scientists have realized that the 'Green Revolution' with high input use has reached its peak and is now diminishing returns. Thus, a sustainable organic alternative is needed.
- **Employment Opportunities**: According to many studies, organic farming requires more labour input than the conventional farming system. India which has a very large amount of

labour unemployment and underemployment can generate agricultural jobs through organic farming in rural areas.

- **Healthy food:** Several indirect benefits from organic farming are available to both the farmers and consumers.
    - While the consumers get healthy foods with better taste and nutritive values, the farmers are indirectly benefited from healthy soils and farm production environment.
- **Eco-tourism:** Eco-tourism is increasingly becoming popular and organic farms have turned into such favourite spots in many countries like Italy.
    - Organic farming adds to the beauty of the fields and provides protection to the ecosystem, flora, fauna with increased biodiversity and the resulting benefits to all human and living beings.

Challenges in Organic Farming in India:

- **Shortage of Biomass:** experts are not sure whether all the nutrients with the required quantities can be made available by the organic materials. Even if this problem can be surmounted, they are of the view that the available organic matter is not simply enough to meet the requirements
- **Disparity of Supply and Demand**: Non-perishable grains can be grown anywhere and transported to any location but this is not the case with fruits and vegetables.
- **Time:** organic farming requires greater interaction between a farmer and his crop for observation, timely intervention and weed control for instance.
- **High MRP:** It is almost obvious that due to the extreme care taken to go along with organic farming, the results would be kept at a high price.
- **Lack of special infrastructure**: Most large organic farms still operate in an industrialized agriculture style, including industrial transportation of the food from field to plate. Unfortunately, this involves the adoption of the same environmentally harmful practices as those of factory farms which are however hidden under the cover of being organic

Important Government Initiatives/Schemes:

- **Paramparagat Krishi Vikas Yojana:** promotes cluster based organic farming with PGS (Participatory Guarantee System) certification. Cluster formation, training, certification and marketing are supported under the scheme.
- **Rashtriya Krishi Vikas Yojana:** Assistance for promotion of organic farming on different components are also available with the approval of State Level Sanctioning Committee
- **One District – One Product:** The programme aims to encourage more visibility and sale of indigenous and specialized products/crafts of Uttar Pradesh, generating employment at the district level.
- **National Mission on Oilseeds and Oil Palm:** Financial assistance is being provided for different components including bio-fertilizers, supply of Rhizobium culture/Phosphate Solubilising Bacteria (PSB)/Zinc Solubilising Bacteria (ZSB)/ Azotobacter/Mycorrhiza and vermin-compost.

- **The Organic Farming Action Programme**: The objective is to promote and significantly develop organic farming by means of priority measures
    - Food Safety and Standards Authority of India(FSSAI) is the food regulator in the country and is also responsible for regulating organic food in the domestic market and imports.
- **Participatory Guarantee System (PGS):** PGS is a process of certifying organic products, which ensures that their production takes place in accordance with laid-down quality standards.
    - PGS Green is given to chemical free produce under transition to 'organic' which takes 3 years. It is mainly for domestic purpose.
- **National Program for Organic Production (NPOP**): NPOP grants organic farming certification through a process of third-party certification for export purposes.

Organic agricultural products exported during last 3 years

S. No.	Year	Exported Qty (In MT)	Value (In Cr)	Value (In USD Million)
1.	2021-22	460320	5249.32	771.96
2.	2020-21	888179	7078.50	1040.96
3.	2019-20	638998	4686.00	689.10

The Way Forward:

Unsustainable agricultural practices have proved to be harmful for land, soil and farmers in general. A switch to organic farming can not only help to achieve sustainable agricultural production but would help farmers with rise in income and production.

An emphasis should be given to organic farming. Sikkim is being such a state to recognise it early and becoming a 100% organic state. Other states should work for the same.

Millets: Future of Sustainable Agriculture

Millets are coarse grains and a repository of protein, fibre, vitamins and minerals.

- They include jowar (sorghum), ragi (finger millet), korra (foxtail millet), arke (kodo millet), sama (little millet), bajra (pearl millet), chena/barr (proso millet) and sanwa (barnyard millet).
- Millets were one of the oldest foods known to humans. But they were discarded in favour of wheat and rice with urbanization and industrialization
- India is their largest global producer, with a 41% market share, and a compound annual growth rate of 4.5% is projected for the global millet market in the coming decade.

Advantages of Growing Millets

Climate Resilience

- Being hardy crops, they can withstand extreme temperatures, floods and droughts.
- They also help mitigate the effects of climate change through their low carbon footprint of 3,218-kg CO2 equivalent per hectare, as compared to wheat and rice, with 3,968kg and 3,401kg, respectively, on the same measure.

Restoration of ecosystems and sustainability:

- Land degradation has been a major problem in India, causing massive economic losses year after year. Drought-tolerant crops, like millets, with low dependence on chemical inputs would put far less pressure on ecosystems.
- The inter-cropping of millets with other crops is especially beneficial because the fibrous roots of millet plants help in improving soil quality, keep water run-off in check and aid soil conservation in erosion-prone areas, thereby restoring natural ecosystems.

Biofuel and Ethanol Blending

- In June 2021, government set a target of achieving 20% ethanol blending with petrol by 2025.
- Most bio-ethanol in India is produced using sugar molasses and maize.
- However, a study conducted among farmers in Madhya Pradesh showed that bio-ethanol can be created using **sorghum (jowar) and pearl millet (bajra**), and that this fuel could bring down carbon emissions by about half.
- Estimates also suggest that millets can deliver greater returns than maize, while using 40% less energy in processing. Millets also offer a significant cost advantage over maize as a feedstock for bio-ethanol production.

A cultural connection:

- The cultivation of millets is deep-rooted in Indian culture.
- Organizations like Deccan Development Society have formed women's collectives in Telangana and are promoting millets through a culture-centric approach.
- Such **crop sensitization** has filtered into urban settings too. In 2018, the #LetsMilletCampaign in Bengaluru saw the use of millets in dishes such as risotto and pizza by restaurateurs.

Helps address Sustainable Development Goals:

- Millets can play a role in India's sustainability policy interventions. Contemporary research developments have shed light on the influence of millets on energy optimization, climate resilience and ecosystem restoration.
- Millet farming has led to women's empowerment, too. The Odisha Millet Mission, for example, saw 7.2 million women emerge as 'agri-preneurs'.

Where does India stand in Millet production?

- India is the largest producer of millet in the world with a share of 41% in 2020, as per FAO. Nine types are grown as kharif crops in over 20 States in the country.
- Major millets include finger millet (ragi or mandua), pearl millet (bajra) and sorghum (jowar) and minor millets include foxtail millet (kangani or kakun), barnyard millet (sawa or sanwa, jhangora), little millet (kutki), kodo millet (kodon), proso millet (cheena) and browntop millet.
- Rajasthan, Karnataka, Maharashtra and Andhra Pradesh are leading producers.
- Though productivity has increased over the years, the area under cultivation of millets declined, especially after the Green Revolution, with a policy thrust on other grains
- This gradually impacted the expansion of millets production in the country. In 2019, India accounted for 80% of the total production of these grains in Asia and 20% globally — around 170 lakh tonnes from138 lakh hectares of land, providing yield per hectare greater than the global average.
- India is also among the top five exporters— India exported millets worth $64.28 million in 2021-22 and $59.75 million in 2020-21.

What are government initiatives to push Millets production?

- **Part of Food Security**: While the National Food Security Act(NFSA) does not mention millets, coarse grains are included in the definition of "foodgrains" under Section 2(5) of the NFSA.
- **Procurement:** The government has set a target to procure 13.72 LMT coarse grains during the Kharif Marketing Season (KMS) 2022-23, more than double the 6.30 LMT procured during KMS 2021-22.
- **MSP for Millets:** The government declares a Minimum Support Price (MSP) for jowar, bajra, and ragi.

- **International Year of Millets:** Millet is grown mainly in low-income and developing countries in Asia and Africa, and are part of the food basket of about 60 crore people across the globe. By proposing the resolution to celebrate 2023 as the International Year of Millets, India pitched itself as a leader of this group. This is similar to India's initiative of International Solar Alliance.

What are the concerns with millets?

- **Selling price was low but now decreasing:** For the poor, both in urban and rural areas, rice and wheat were once aspirational foods.
    - But due to the Green Revolution and the National Food Security Act of 2013, two-thirds of India's population receives up to 5 kg of wheat or rice per person per month at Rs 2 and Rs 3/kg respectively.
    - The present government has, in fact, made the issue of the two fine cereals free of cost from January 2023.
    - This move further tilted the scales against millets.
- **Work required to make it ready for eating:** Even for the better-off, rolling rotis is easier with wheat than millet flour.
    - This is because the gluten proteins, for all their drawbacks, make the wheat dough more cohesive and elastic.
    - The resultant breads come out light and fluffy, which isn't the case with bajra or jowar.
- **Low per hectare yields:** For farmers, the national average is roughly 1 tonne for jowar, 1.5 tonnes for bajra and 1.7 tonnes for ragi, as against 3.5 tonnes for wheat and 4 tonnes for paddy — are a disincentive.
    - With access to assured irrigation, they would tend to switch to rice, wheat, sugarcane, or cotton.
- **Absence of Government support:** The absence of government procurement at minimum support price (MSP), unlike in paddy and wheat, make farmers hesitant to grow even this high-yielding and naturally bio-fortified bajra (Pusa-1201).
- **Orphan crops:** The millets have been reduced to "orphan crops" over the years, planted largely in marginal areas prone to moisture stress.
- **Poor Consumption behaviour:** Less than 10 per cent of rural and urban households reported consumption of millets. For instance: In rural areas, of the 11.231 kg of cereals consumed by a person in a month in 2011-12, 6.125 kg was rice, and 4.439 kg was wheat. Very little millets were consumed: 201 grams jowar, 246 g bajra, 75 g ragi, and 4 g of small millets.
- **Regional Imbalancement in consumption of millets:** The consumption of millets was reported mainly from Gujarat (jowar and bajra), Karnataka (jowar and ragi), Maharashtra (jowar and bajra), Rajasthan (bajra), and Uttarakhand (ragi).

Suggestive measures:

Promoting Use of millets: The nutritional traits, similar to bajra, are present in other millets too: jowar (sorghum), ragi (finger millet), Kodo (Kodo millet), kutki (little millet), kakun (foxtail millet), sanwa (barnyard millet), cheena (proso millet), kuttu (buckwheat) and chaulai (amaranth).

- Their use should also be increased.
- Besides midday meals, millets could be served in the form of ready-to-eat foods such as cookies, laddu, murukku, nutrition bars, and extruded snacks (think healthier versions of Maggi, Kurkure, or Cheetos).

Huge market base for millets: India, according to the latest official data for 2021-22, has 26.52 crore children enrolled in 14.89 lakh schools from the pre-primary to higher secondary levels.

- In addition, 71 crore children and 1.80 crore pregnant and lactating women are being provided supplementary nutrition in 13.91 lakh Anganwadis care centres.
- **Given the dire need to alleviate micronutrient malnutrition — especially iron and zinc deficiency** that are major causes of anaemia and stunting respectively, while also contributing to impaired cognitive performance and vulnerability to diarrhoea — millets could be made a staple part of children's diets.

One bajra meal each day in Government Schemes: Every schoolchild and Anganwadis beneficiary can be served one daily hot meal based on locally-sourced bajra, jowar, ragi, Kodo, or kutki, along with a 150-ml glass of milk and one egg.

- It will help combat hidden hunger, besides giving a boost to crop diversification by creating demand for millions of small millet, dairy and poultry farmers.
- The Centre has two existing schemes — Pradhan Mantri Poshan Shakti Nirman and Saksham Anganwadi and Poshan 2.0 — with a combined budget of Rs 30,496.82 crore in 2022-23. These can be better leveraged by making them more millets-focused.

Government's funding: The Centre could fund any state willing to procure millets specific to their region exclusively for distribution through schools and Anganwadis.

- Odisha already has a dedicated millet mission that undertook procurement of 32,302 tonnes worth Rs 109.08 crore, mainly of ragi, in 2021-22.
- Rajasthan, Uttar Pradesh, and Haryana might want to do the same in bajra, just as Maharashtra may for jowar, Karnataka for ragi and Madhya Pradesh for Kodo/ kutki.

Combined funding: A combination of central funding with decentralised procurement linked to nutrition goals — specifically the eradication of hidden hunger among school-age children — can do for millets what the Food Corporation of India achieved with rice and wheat.

The Way Forward:

Therefore, it is evident that there is a need to promote the production of more millets by providing price support to farmers as there's not only a social dimension but also a nutritional and environmental aspect associated with these cereals. There's a need for developing a decentralised model of processing capabilities so that the growers stand to benefit at a community level and in the

growing regions. Thus, promoting millets could help governments save expenditure on health and nutrition.

Challenges Faced by Rural Women in Agriculture

- **Lack of recognition:** Women's roles as primary producers are often overlooked, and are treated merely as **consumers of social services.**
    - This perpetuates a **cycle of drudgery, limited skill development, and exclusion from decision-making processes.**
- **Skill development:** Limited avenues for skill development lead to women being relegated to **low-skilled, time-consuming, and monotonous farm activities.**
    - The increasing **mechanization of agriculture threatens their participation** unless they are provided with opportunities to acquire new skills, such as operating machinery.
- **Land ownership and records:** Women own only **13.9 percent of operational holdings,** reflecting a **gender disparity in land ownership** and prevailing land fragmentation practices.
    - **Though the Hindu Succession Act, 2005** allows daughters equal rights in ancestral property, the same is not true for agricultural land.
- **Poor credit access: Lack of asset ownership** makes credit facilities inaccessible to women**.**
    - Rural financial institutions hesitate to serve female clients due to **stringent requirements and their limited borrowing experience.**
- **Inequality in market access:** Gender discrimination **restricts women's mobility,** limiting their access to marketplaces and hindering economic opportunities.

Government Initiatives to empower female farmers:

- **The SHG-Bank linkage program by NABARD** has **relaxed collateral requirements** for availing loan
- **The Mahila Kisan Sashaktikaran Pariyojana**
- Encouraging women's leadership roles in **farmer producer organizations**
- Skill development programs under the **Pradhan Mantri Kaushal Vikas Yojana**
- Financial inclusion schemes like **Pradhan Mantri Jan Dhan Yojana and Pradhan Mantri Mudra Yojana**

Dryland Farming

Dryland farming is a challenging practice that requires understanding local climate and soil conditions, selecting suitable crops, and utilizing appropriate technologies. This article explores the significance of dryland farming in India, the constraints faced, and the potential for sustainable food security.

- **Diverse Agro-climatic Zones:** India's unique geographical location results in varied climatic conditions and cropping patterns across the country.
- **Addressing Climate Change:** Helps address climate change and ensures sustainable food security.

Major Crops

- Millets, oilseeds, pulses, maize, cereals, and cotton are important crops.
- Millets are drought-resistant, climate-resilient, and eco-friendly crops.
- Oilseeds and pulses play a significant role in rainfed regions, contributing to vegetable oil production and soil health.

Challenges Associated with Dryland Farming

- **Rainfall Dependency:** Making it vulnerable to erratic and uncertain rainfall patterns.
- **Soil and Nutrient Constraints:** Dryland areas often have poor or degraded soils with low water-holding capacities and nutrient deficiencies.
- **Vulnerability to Drought:** Susceptible to drought and declining groundwater levels.
- **Small Land Holdings:** Challenging due to fragmented and small land holdings.

Strategies for Sustainable Dryland Farming:

- **Integrated Farming:** Can increase productivity by adopting integrated farming models with multiple crops.
- **Crop Selection:** To maximizing productivity, there's a need to select suitable crops adapted to the environment.
- **Technology Adoption:** Utilizing drip irrigation, water harvesting, and precision farming improves water-use efficiency and yields.
- **Soil Conservation:** Mitigate erosion and retain soil moisture through practices like contour ploughing, terracing, and mulching.
- **Capacity Building:** Empower farmers through training and knowledge transfer on dryland farming techniques.
- **Market Support**: Strengthen market infrastructure and value chains to enhance profitability and market access.
- **Research and Development:** Continued efforts are needed to develop crop varieties and technologies for dryland farming.

Way Forward:

- CRIDA (Central Research Institute for Dryland Agriculture) has developed 'The Vision 2050'.
- Emphasis on location-specific research, rainwater harvesting, and soil health management.
- Integrated farming modules for risk-proofing small and marginal farmers.
- Exploiting cutting-edge technologies like remote sensing and GIS for resource characterization.
- Development of nanotechnology-based products for dryland agriculture.
- Implementing energy efficiency, precision agriculture, and renewable energy sources in dryland regions.

The dryland areas have tremendous potential for increasing food production which, if realised, would boost the agriculture dependent economy of the country. It will also help address the problem of hunger and malnutrition prevailing in disadvantaged and resource poor sections of society.

All the best,

Team IASbaba 😊

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