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**DAILY EDITORIAL
ANALYSIS**

TOPIC

**MECHANISATION OF
INDIAN FARMING SECTOR**

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MECHANISATION OF INDIAN FARMING SECTOR

Syllabus: GS3/Agriculture

Context

- Recent replies in Parliament showed that the overall average mechanisation level for crops stands at 47%, and it will take another 25 years to reach 75-80% mechanisation in India.

About Farm Mechanisation in India

- Farm mechanisation refers to the **adoption of machinery and technology** in various agricultural operations. It plays a pivotal role in **enhancing productivity, reducing manual labour, and ensuring timely and efficient farm practices**.
- In India, where agriculture remains a **backbone of the economy**, mechanisation becomes even more critical.

Current Scenario

- Overall Mechanisation Level:** The available data for major crops—such as rice, wheat, maize, sorghum, millets, pulses, oilseeds, cotton, and sugarcane—paints a picture of **47% overall mechanisation**.
- While states like Uttar Pradesh, Haryana, and Punjab have relatively high mechanisation levels, the northeastern states lag behind significantly.

Operation-wise average mechanisation levels



Crop-Specific Insights

- Wheat:** Leading the pack, wheat achieves 69% mechanisation.
- Rice:** Not far behind, rice clocks in at 53% mechanisation.
- Others:** Maize (46%), pulses (41%), oilseeds (39%), cotton (36%), and sugarcane (35%) are still catching up.
- Sorghum and Millets:** These crops lag at 33% mechanisation.

Key Areas of Mechanisation

- Seed-Bed Preparation:** This operation is highly mechanised (over 70%) for major crops like rice and wheat. Proper seedbed preparation ensures optimal soil conditions for planting.
- Sowing and Planting:** Mechanisation levels vary, with wheat sowing being the most mechanised. Sugarcane and rice transplanting still rely significantly on manual labour.
 - At 40%, there's room for improvement.
- Weeding and Inter-Culture:** Currently mechanised to 32%.

Automating agriculture

Crop-wise farm mechanisation

(in %)

Crop	Seed-bed preparation	Sowing, planting, transplanting	Weeding, inter-culture and plant protection	Harvesting and threshing	Crop-wise average
Rice	80	35	35	60	53
Wheat	85	65	50	75	69
Maize	70	45	40	30	46
Sorghum and millets	60	30	20	20	33
Pulses	65	40	25	35	41
Oilseed	65	40	20	30	39
Cotton	70	40	35	0	36
Sugarcane	65	25	30	20	35

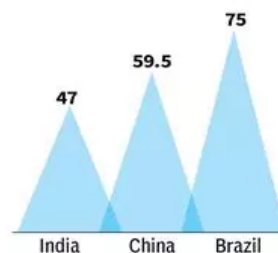
- **Harvesting and Threshing:** This critical phase stands at 34% mechanisation.
 - ♦ Surprisingly, this area remains the least mechanised for most crops, except rice and wheat. Rice and wheat harvesting see mechanisation levels of over 60%, while cotton lags behind.

Global Comparisons

- **United States:** The U.S. leads the way with a mechanisation level of 95%. Advanced technologies, precision agriculture, and large-scale farming contribute to this impressive figure.
- **Brazil:** Brazil stands at 75% mechanisation. Its vast agricultural expanses, especially in soybean and sugarcane cultivation, benefit from modern machinery.
- **China:** China, with 59.5% mechanisation, has made significant strides. Its focus on rice and wheat production, along with government support, drives mechanisation efforts.
 - ♦ India's overall mechanisation level lags behind countries like China (59.5%) and Brazil (75%).
- While India's farm mechanisation industry is valued at around 9,200 crores (as of 2022), the global industry stands at approximately \$100 billion. India aims to grow its share to ₹15,000 crores by 2026.

India vs other developing nations

Farm mechanisation level (in %)



Advantages

- Saves 15-20% on seeds and fertilizers
- Improves seed germination by 7-25%
- Reduces time spent by 20-30%
- Cuts weed levels by 20-40%
- Lowers labour requirement by 20-30%
- Increases the number of crops grown per year by 5-20%
- Boosts crop yields by 13-23%

Source: Parliament answers; Parliamentary standing committee on agriculture

Factors at Play

- **Socio-Economic Conditions:** Different economic realities influence farmers' choices.
- **Geographical Factors:** Terrain, climate, and soil type impact the feasibility of mechanisation.
- **Crop Diversity:** Different crops have unique requirements.
- **Irrigation Facilities:** Availability of water plays a role.

Benefits of Mechanisation

- **Cost Savings:** Farmers save 15-20% on seeds and fertilisers.
- **Improved Germination:** Mechanization boosts seed germination by 7-25%.
- **Time Efficiency:** It saves 20-30% of farmers' time.
- **Small and Marginal Farmers:** With 86% of farmers owning less than 2 hectares, tailored machinery for small holdings is crucial.

Challenges

- **Skills Gap:** Many farmers lack awareness about modern technology and machinery management.
- **Small Landholdings:** India has a large number of small and marginal farmers, making individual ownership of expensive machinery economically challenging.
- **Rainfed Agriculture:** Half of India's arable land depends on rainfed agriculture, which requires tailored mechanisation solutions.

Related Government Initiatives

- **Sub-Mission on Agricultural Mechanisation (SMAM):** Launched in 2014-15, this centrally sponsored scheme aims to promote farm mechanisation. It provides financial assistance for purchasing agricultural machines, establishing **Custom Hiring Centres (CHCs)**, and setting up **Farm Machinery Banks (FMBs)**.
 - ♦ **Components of SMAM** include *Hubs for Hi-tech & High-value Farm Equipment, Awareness and Skill Development, and Quality Assurance along with the CHCs, and FMBs.*
 - ♦ From 2014-15 to 2020-21, over 4,556.93 crores have been released under SMAM, resulting in the establishment of more than 27,500 Custom Hiring Institutions and distribution of over 13 lakh agricultural machines.
- **Make in India:** The government encourages domestic manufacturers to produce agricultural machinery through research and development support, skill development, and simplified rules for testing.

- ◆ Preference is given to domestically manufactured products in public procurement, fostering a level playing field for Indian manufacturers.

State-Specific Initiatives

- States like Rajasthan and Karnataka have also taken steps to promote farm mechanisation. For instance:
- **Rajasthan:** The state budget includes an agri-tech mission that provides subsidies for various types of equipment, benefiting small and marginal farmers and women farmers.
- **Karnataka:** The state aims to establish 100 Harvester Hubs and invest in farm mechanisation projects under the Krishi Bhagya scheme.
 - ◆ Karnataka emphasises the importance of scientific farming and integrated farming systems to improve farmers' income.

What more to be done for achieving 75-80% Farm Mechanisation in India?

- **Financial Support and Incentives:** Offering subsidies or financial incentives for purchasing agricultural machinery encourages adoption. Governments can provide targeted support for small and marginal farmers.
- **Indigenous Solutions:** Encouraging research and development for locally relevant machinery is essential.
 - ◆ 'Make in India' initiatives should focus on creating equipment suited to Indian soil conditions, crop types, and farm sizes.
- **Precision Farming Technologies:** Investing in precision agriculture technologies (such as GPS-guided tractors, drones, and sensor-based systems) can optimise resource use and improve yields.

Infrastructure Development

- **Rural Roads and Connectivity:** Improved rural infrastructure ensures smooth transportation of machinery to farms.
- **Electricity Access:** Reliable electricity supply is critical for running electric-powered machinery. Promoting solar-powered solutions can address energy challenges.

Collaboration with Private Sector

- **Industry Partnerships:** Collaborating with private companies, especially farm equipment manufacturers, can accelerate innovation and technology adoption.
 - ◆ **Mahindra & Mahindra** emphasises the importance of automation technologies, including self-driven tractors, can reduce manual interventions, enhance productivity, and minimise costs for farmers.
 - ◆ Mahindra's recent OJA tractor range incorporates cutting-edge technologies to empower smaller farmers.
- **Start-ups and Agri-Tech Companies:** Supporting start-ups that focus on mechanisation and precision farming can drive technological advancements.

Customisation for Small Landholdings

- **Small and Marginal Farmers:** Given that a majority of Indian farmers have small landholdings, customised solutions (e.g., mini tractors, small-scale implements) are essential. Cooperative models for machinery sharing can be explored.
- **Affordable Technology:** Developing cost-effective machinery suitable for small plots is crucial.

Policy Reforms

- **Trade Policies:** Ensuring import restrictions on low-quality machinery while promoting domestic manufacturing.
- **Incentivising Research:** Tax breaks and grants for companies investing in R&D for farm equipment.

Promotion of Agri-Entrepreneurship

- **Young Entrepreneurs:** Encouraging youth to venture into agri-mechanisation services can create a network of service providers.
- **Skill Development Institutes:** Establishing institutes that train technicians in farm machinery repair and maintenance.

Monitoring and Evaluation

- **Performance Assessment:** Regularly evaluating the impact of mechanisation programs helps identify gaps and refine strategies.
- **Data-Driven Approaches:** Using data analytics to understand adoption rates, challenges, and success stories.

Conclusion

- Farm mechanisation is not just about replacing human labour; it's about bridging efficiency gaps, ensuring food security, and sustaining livelihoods. As India continues its agricultural journey, smart mechanisation will play a pivotal role in shaping a prosperous and resilient farming sector.

Source: BL



Mains Practice Question

[Q] How can India effectively bridge the mechanisation gap in its agricultural sector to ensure food security, increase farmer income, and promote sustainable farming practices?

