Rebuilding India's Agricultural Sector

This editorial is based on "Why farmers remain unhappy with the government" which was published in The Indian Express on 22/11/2024. The article brings into picture the challenges faced by India's agricultural sector, supporting 40% of the population, in balancing technological advancements with traditional practices. It highlights the need for a sustainable ecosystem that bridges innovation with farmers' needs while ensuring food security.

For Prelims: India's agricultural sector, Foreign Direct Investment in Agriculture, Heat waves , Economic Survey 2023-24, e-NAM , MSP (Minimum Support Price), Ministry of Food Processing Industries, NPK fertilizers, Soil Organic Carbon, Stubble burning, Drought-resistant crop varieties

For Mains: Key Challenges Confronting India's Agricultural Sector, Measures can be Adopted to Strengthen India's Agriculture Sector.

India's agricultural sector, employing **42.3% of the population,** stands at a critical juncture where **policy implementation faces significant structural challenges.** The interplay between technological adoption, from **biotechnology** to modern farming solutions, requires careful balance with traditional agricultural practices and farmers' acceptance. The fundamental challenge lies in building a sustainable agricultural ecosystem that effectively bridges the gap between **scientific innovations, ground-level implementation, and farmers needs while ensuring food security for the nation.**

How India's Agriculture Sector is Performing Currently?

- **Key Agricultural Metrics and Growth:** In the 2022-23 period, India achieved a **foodgrain production of 330.5 million metric tonnes (MT),** maintaining its status as the **second-largest producer globally.**
  - Additionally, horticultural output reached a record 351.92 million tonnes (MT), reflecting a 1.37% increase from the previous year.
- **Market Performance:** The Indian agricultural sector is **projected to reach a market size of US$ 24 billion by 2025.** The Indian food and grocery market is ranked as the sixth largest globally, with retail contributing 70% to sales.
  - For Kharif 2023-24, foodgrain production is estimated at 148.5 million tonnes, demonstrating continued growth in key agricultural outputs.
- **Investment and Export Trends:**
  - **Foreign Direct Investment (FDI)**: From **April 2000 to March 2024**, the agriculture services sector attracted **USD 3.08 billion in FDI**.
    - The food processing industry, a major segment of agriculture, garnered US$ 12.58 billion in FDI, **accounting for 1.85% of total FDI inflows.**
  - **Agricultural Exports**: India's agricultural and processed food products exports reached **USD 4.34 billion in 2024-25 (April-May).** Key exports included:

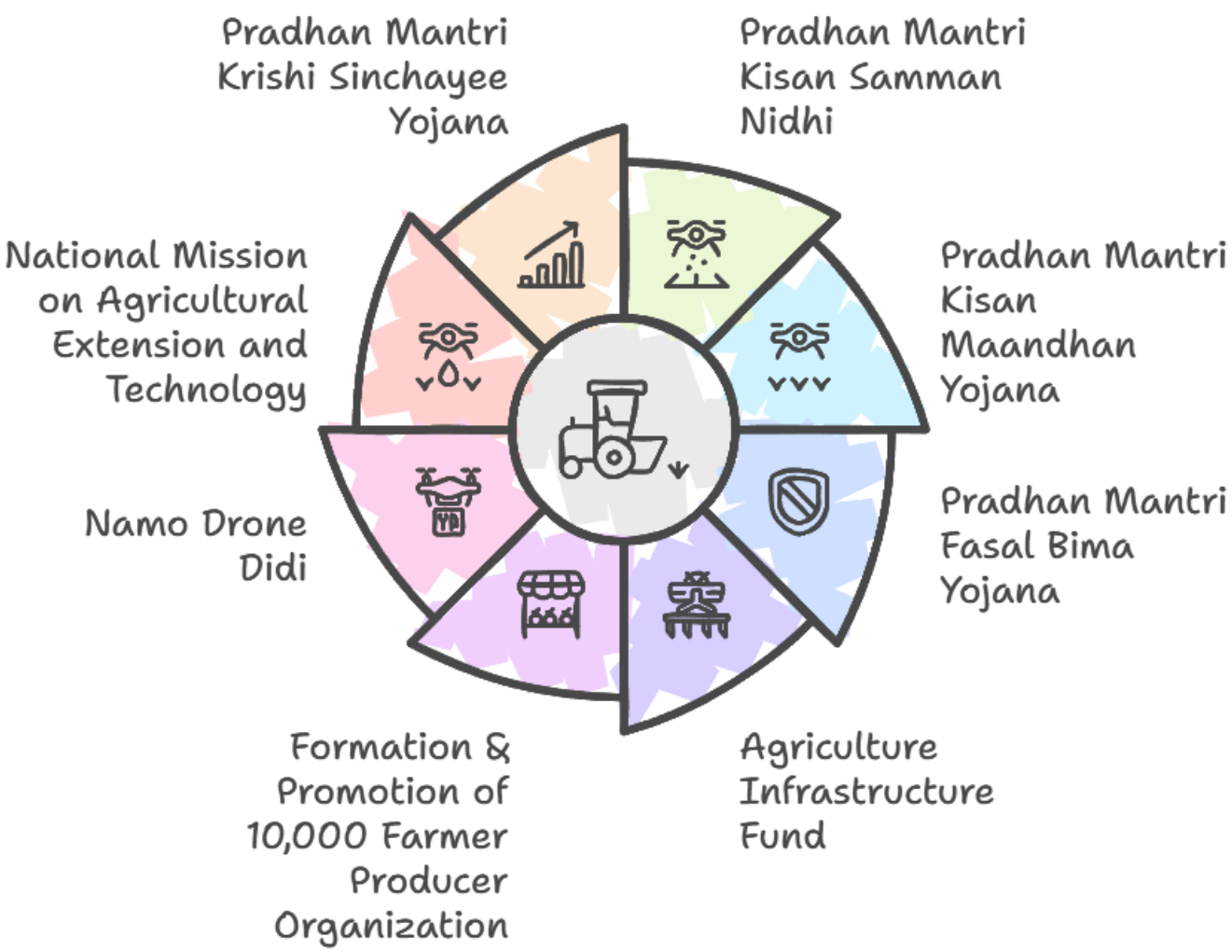
- **Marine Products:** US$ 1.07 billion
- **Rice (Basmati and Non-Basmati):** US$ 1.96 billion
- **Spices:** US$ 769.22 million

What are the Key Challenges Confronting India's Agricultural Sector?

- **Climate Change Vulnerability:** The increasing frequency of **extreme weather events** is severely impacting crop yields and farming patterns across India.
  - **Heat waves, erratic rainfall, and unseasonal rains** have created unprecedented challenges for traditional agricultural calendars and crop choices.
  - In 2023, India experienced its **second-warmest year on record**. The **Economic Survey 2023-24** highlights that extreme weather, reduced reservoir levels, and crop damage have impacted farm output and driven up food prices in the past two years.
- **Water Stress and Irrigation Inefficiency:** India's agricultural sector continues to be the **largest consumer of water** while operating at sub-optimal irrigation efficiency levels.
  - The dominance of **flood irrigation methods persists despite their high water wastage,** while micro-irrigation adoption remains low.
  - India uses **2-3 times more water for producing 1 ton of cro**p compared to several developed and developing nations.
    - Notably, only **11% of India's agricultural land is under micro-irrigation**.
- **Land Fragmentation and Declining Farm Sizes:** The continuous division of agricultural land is severely impacting economic viability of farming operations and technology adoption.
  - The **average farm size has shrunk**, making mechanization and modern farming practices increasingly difficult to implement effectively.
  - The average landholding for farming among farmers in the country decreased from 1.08 hectares in 2016-17 to just **0.74 hectares in 2021-22.**
- **Market Access and Price Realization:** Farmers continue to face significant challenges i**n getting fair prices for their produce** due to multiple intermediaries and inadequate market infrastructure.
  - Despite the establishment of **e-NAM and various market reforms,** the price spread between farm gate and retail remains high.
  - An **RBI study** reveals that farmers receive **only a third of the price consumers pay for fruits and vegetables.**
  - The **three farm laws repeal in 2021** highlighted the ongoing issues of market access and fair pricing, with farmers protesting the lack of adequate safeguards for **MSP (Minimum Support Price)** and concerns over corporate control of markets, further emphasizing the need for stronger reforms.
- **Technology Adoption Gap:** Despite being th**e third-largest startup ecosystem globally**, India's agritech penetration remains low with significant resistance to new technologies.
  - The **digital divide** and lack of technical knowledge continue to hamper modern agriculture practice adoption.
  - As of 2023, **only 30% of Indian farmers utilize digital technology in agriculture,** with rural digital literacy remaining at just 25%.
- **Post-Harvest Infrastructure Deficit:** India continues to face significant **post-harvest losses** due to inadequate storage, processing, and cold chain infrastructure.
  - This gap particularly **affects perishable commodities** and reduces farmers' ability to hold produce for better prices.
  - India's post-harvest losses amount to approximately **₹1,52,790 crore annually,** according to a **Ministry of Food Processing Industries** 2022 study.
  - Also, over **90% of India's cold chain logistics sector** is fragmented and privately owned, lacking standardization.
- **Credit and Insurance Coverage:** Despite significant progress in institutional credit flow to agriculture, small and marginal farmers still **struggle with formal credit access.**
  - The inadequate insurance coverage and delayed claim settlements continue to affect farmers' risk management capabilities.
  - Only **41% of small and marginal farmers** accessed bank credit, while gross **non-performing assets** in the agriculture sector reached **9.8%.**
- **Soil Health Degradation:** Excessive chemical fertilizer usage and mono-cropping have led to severe soil degradation across major agricultural regions.

    - The **indiscriminate use of NPK fertilizers** has created serious nutrient imbalances affecting long-term soil productivity.
    - About **30% of India's land is experiencing degradation due to rising fertilizer consumption,** imbalanced use of fertilizers and wrong soil management .
    - The **Soil Organic Carbon (SOC)** content in India has declined **from 1% to 0.3% over the past 70 years**, raising concerns for the agricultural sector(National Rainfed Area Authority).
    - Additionally, the issue of **stubble burning** exacerbates **air pollution and soil health degradation,** further affecting agricultural productivity.
- **Crop Diversification Challenges:** Despite policy push, farmers remain locked in water-intensive wheat-rice cycles due to assured procurement systems and Minimum Support Price.
    - Diversification to **pulses, oilseeds, and horticultural crops** faces market uncertainties.
    - While India is the **largest producer of pulses in the world**, the production of pulses is not sufficient to meet the growing domestic demand of **22.42 million tonnes.**
- **Feminisation of Agriculture**: The feminization of Indian agriculture has led to women taking on a greater share of agricultural work while facing **limited access to resources like land, credit, and technology.**
    - Nearly 63% workers are female in the agriculture sector at the pan-India level, but women own **only 11-13% of operational land holdings**, which restricts their decision-making power.
    - This gender disparity in access to resources and opportunities **limits women's productivity and economic security in agriculture.**
    - Furthermore, their work is **often undervalued and unrecognized, hindering their empowerment**.

What are the Key Government Initiatives Related to Agriculture?



What Measures can be Adopted to Strengthen India's Agriculture Sector?

- **Digital Agriculture Ecosystem:** Develop an integrated digital platform connecting all agricultural services - **from soil testing to market access.**
  - Implement **blockchain for supply chain transparency** and **fair price discovery**. Create a unified database linking land records, crop patterns, and credit history to enable precise policy interventions.
  - Launch mobile-based extension services with localized content in regional languages.
  - In the first quarter of the 2024-25, trade on the government's **e-NAM platform surpassed Rs 18,990 crore**, marking a significant step towards digitalisation of agriculture.
- **Climate-Smart Agriculture**: Integrate **weather-based agricultural advisories** with direct farmer messaging systems.
  - Promote **drought-resistant crop varieties** and **water-efficient farming** techniques through demonstration plots. Implement community-managed seed banks for climate-resilient varieties.
  - The Indian Prime Minister recently released **109 weather-resilient, high-yielding, and bio-fortified seed varieties** of agricultural crops is a significant step.
- **Water Management Revolution:** Mandate **micro-irrigation for water-intensive crops through incentive-based policies.**
  - Implement **community-led water budgeting** and crop planning based on water availability.
  - Promote precision irrigation technologies through **FPO-managed custom hiring**

centers. Scale up **successful watershed development programs like Neeranchal Watershed Program** with clear outcome metrics.

- **Strengthening Farmer Producer Organizations(FPO):** Transform FPOs into comprehensive business entities handling **input supply, processing, and marketing.**
    - Provide dedicated business development support and market linkages. Create a **special credit rating system for FPOs to improve their access to formal credit.** Establish technology and quality control centers managed by FPOs.
    - The **"Viruthai Millets Farmer Producer Company Ltd (VMFPOL)"** in Tamil Nadu specialized in millets' production, value addition, and marketing, can be a role model.
- **Post-Harvest Infrastructure Development:** Establish **hub-and-spoke model for storage infrastructure at village** and block levels.
    - Implement PPP models for **cold chain development with assured procurement linkages.** Create multi-commodity storage facilities with quality testing laboratories.
    - **Punjab Agricultural University (PAU) initiative**, which introduced a paddy straw management system in Punjab can be expanded to other parts of the country.
- **Agricultural Credit Reforms:** Introduce **flexible credit products aligned with crop cycles and farmer incomes.**
    - Implement direct benefit transfer for interest subvention to improve targeting. Create **a specialized credit guarantee fund** for innovative farming practices. Develop credit products for allied activities and farm mechanization.
    - **Kerala's Farmer-Friendly Credit Model** enhances fruits and vegetable production, offers a viable model.
- **Soil Health Management**: Implement mandatory **soil health cards** linked to fertilizer sales through **PoS systems**.
    - Promote **bio-fertilizers and organic inputs through local production units**. Create village-level soil testing facilities managed by trained rural youth.
    - Introduce **performance-based incentives for improving soil organic carbon content**.
- **Sustainable Energy in Agriculture:** Promote **solar pump sets through community ownership models.** Implement **biomass-based power generation** using crop residues.
    - Create energy-efficient cold storage facilities using renewable energy. Develop solar-powered processing units at village level. **Modhera, a** village in the **Mehsana district of Gujarat** as India's first solar-powered village can serve as a model too.
- **Circular Agriculture Economy:** Implement **waste-to-wealth programs** converting agricultural residue into value-added products.
    - Establish composting clusters managed by **women's self-help groups for organic fertilizer production.**
    - Create **village-level biogas plants** using crop waste for local energy generation
- **Alternative Farming Systems:** Promote vertical farming in peri-urban areas using low-cost hydroponic systems.
    - Implement **aquaponics systems for small farmers** combining fish and vegetable production.
        - Develop **rooftop farming models for urban food security** and farmer income.
    - The **success of Mumbai's suburban vertical farms** shows viable alternatives.
- **Women Empowerment in Agriculture:** Create women-led agricultural technology training centers.
    - Implement **special credit schemes for women farmer**s with simplified documentation.
    - The **“Mahila Kisan Sashaktikaran Pariyojana” (MKSP),** a sub component of the **Deendayal Antyodaya Yojana-NRLM (DAY-NRLM)** needs to be further strengthened.

Conclusion:

India's agricultural sector, a cornerstone of its economy and food security, needs a holistic approach, combining **government policies, private sector investment, and farmer-led innovation,** to unlock the sector's full potential. By embracing sustainable practices, empowering farmers, and leveraging technology, India can **not only meet its domestic food needs but also emerge as a global agricultural powerhouse.**

Drishti Mains Question:

In India, agricultural policy has evolved to meet the changing needs of the rural economy. Evaluate the effectiveness of India's agricultural policies in addressing the concerns of farmers, food security, and sustainability.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. In the context of India's preparation for Climate -Smart Agriculture, consider the following statements: (2021)

1. The 'Climate-Smart Village' approach in India is a part of a project led by the Climate Change, Agriculture and Food Security (CCAFS), an international research programme.
2. The project of CCAFS is carried out under Consultative Group on International Agricultural Research (CGIAR) headquartered in France.
3. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India is one of the CGIAR's research centres.

Which of the statements given above are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Ans: (d)

Q. Consider the following pairs: (2014)

1. Programme/Project Ministry
2. Drought-Prone Area Programme Ministry of Agriculture
3. Desert Development Programme Ministry of Environment and Forests
4. National Watershed Development Project for Rainfed Areas Ministry of Rural Development

Which of the above pairs is/are correctly matched?

(a) 1 and 2 only

(b) 3 only

(c) 1, 2 and 3

(d) None

Ans: (d)

Q. In India, which of the following can be considered as public investment in agriculture? (2020)

1. Fixing Minimum Support Price for agricultural produce of all crops
2. Computerization of Primary Agricultural Credit Societies
3. Social Capital development

4. Free electricity supply to farmers
5. Waiver of agricultural loans by the banking system
6. Setting up of cold storage facilities by the governments

Select the correct answer using the code given below:

(a) 1, 2 and 5 only

(b) 1, 3, 4 and 5 only

(c) 2, 3 and 6 only

(d) 1, 2, 3, 4, 5 and 6

Ans: (c)

Mains:

Q. Given the vulnerability of Indian agriculture to vagaries of nature, discuss the need for crop insurance and bring out the salient features of the Pradhan Mantri Fasal Bima Yojana (PMFBY). (2016)

Q. Explain various types of revolutions, took place in Agriculture after Independence in India. How these revolutions have helped in poverty alleviation and food security in India? (2017)
