

Q1

Artificial Intelligence and Precision Farming have been proposed as solution to improve agricultural productivity in India. Critically analyze their feasibility and challenges in Indian agricultural Landscape.

Ans

Precision Farming is advanced or modified method of agricultural practice that use Technology and AI to improve productivity. It aims to bring digital agricultural revolution.

PROVISION OF AI AND PRECISION FARMING IN BUDGET

1) [PM Dhanaya Dhanaya Krishi Yojna]

- AI Driven Precision Farming

2) [Vegetable and fruits]

- AI Based Predictive Farming Models

3)

National Mission on high yielding seeds

- Seed biotechnology - , Germplasm bank

4)

Indian Post on Rural Economic Catalyst

- E-commerce platform)

5)

Kisan Credit Card

- Customised Credit Card .

6)

Building Rural Prosperity & Resilience

- Digital support to rural MSME

7)

Mission for Atmanirbhar in Pulses

- High yielding disease variety seeds

FEASIBILITY AND CHALLENGES OF

Precision Farming and AI

1) PN Dhamya Dhamya Krishi Yojna

Feasibility

- ① AI driven Soil Health Monitoring

- ② Drone Based Pesticide Application

- ③ Digital Banking, AgriFin Tech Solutions

Eg: WEF report = 30% increase in growth
2022 using precision farming

Challenges

- ① Lack of Training of using AI Based Tech.
- ② Lack of institution Credit
- ③ High input Cost

2) Building Rural Prosperity & Resilience

Feasibility

- ① Good fund of fund Rural MSME
- ② Agribusiness Startup

World Bank
2023

Digital Commerce Infrastructure
result in 30% growth

Eg: Kibbutz model (Israel)

Challenges

- ① Accessibility of Credit
- ② Logistic development
- ③ Local entrepreneurship Training

Nuband
report
2022

= 41% depend on informal sector
for Livelihood



3) Mission for Amanishata in Pulses

Feasibility

- ① Climate resilient Variety of pulse,
- ② High yielding disease variety seeds

Amartha Sen book = "Poverty & = Market Stability and
famine State intervention boost
food security

Challenges

- ① Price Volatility in Market

e.g. Ministry of Commerce = 15% increase in price per year

② Bureaucratic Bottleneck, Policy Implementation Gap

③ MSP Not functional on pulses (NITI Nayog)

4) Vegetable and fruits

Feasibility

- ① AI Based Predictive Pricing Model
- ② Smart Cold Storage.
- ③ AI Based Demand forecasting

Thomas Hagger = Alchemy of air = Technology in Agriculture
increase productivity



(Challenge) → ① Lacking Access of Cold Storage

eg: FAO report = only to Big Corporates

② Lackmg in Market Linkages, Post harvest Loss

5) National Mission on high yielding Seeds

(Feasibility) → 1500 Gene on seed Biotechnology
R&D, Germplasm Bank

World Economic
forum report = Investment in Germplasm Bank
increase productivity By 40%.

(Challenge) → ① Improvement in R&D infrastructure
② Availability of high quality Seed

6) Mission for Cotton Productivity

(Feasibility) → ① Gene Editing Tech
② ELS Cotton Production

challenge → ① Use of Traditional Seed

7) Indian Post as Rural Economic Catalyst

(Feasibility) → ① 10 Lakh Bank Account
② New platform = E-commerce
③ Farmer Producer Organisation

(Challenge) → ① Low price for Produce
② Involvement of Middleman



- Way forward
- ① More investment in Research of agriculture
 - ② More Global Cooperation to ease feasibility of use of AI
 - ③ Sustainable and inclusive approach.

As given in Book
of Richard Baldwin book "Great Convergence"
Technology in agriculture Can Change
Landscape of Indian agriculture . By Tackling
existing challenges , Use of AI can bring
digital green revolution that aims to achieve
"Zero Hunger" of UN SDG Goal By 2030



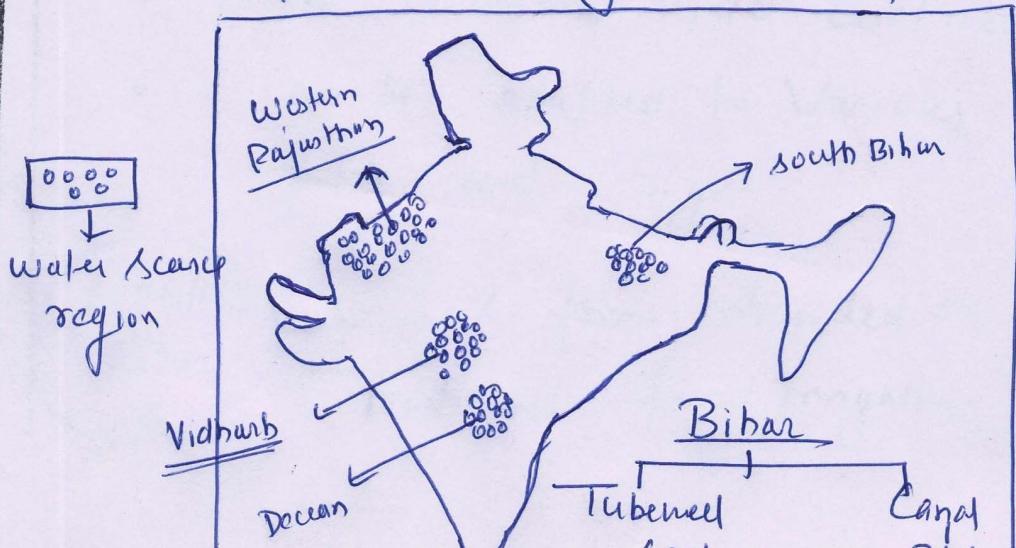
Q2 Water Scarcity is one of major challenges in Indian agriculture. Evaluate Role of micro irrigation Technique in addressing issue and discuss policy measure needed for widespread adoption.

Ans "The future belongs to Nation with grain and not guns"

MS Subramanian

Indian agriculture is backbone of economy giving employment to 45% of work force. It has evolved with time shifting to precision Based farming.

Water Scarcity is one of challenge in India. It is depicted in given Map



Indian agriculture has various challenges associated. Water Scarcity is one of major challenges, creating challenges in growth of agriculture.

ROLE OF MICRO IRRIGATION TECHNIQUE

1) Technologies

a) Drip irrigation

- directly deliver water to plant roots
- reduce water use by (30-50)%
- minimize surface runoff

b) Sprinkler System

- More uniform water distribution.
- Can be adapted to Various field and Size.

NABARD
Report

→ 60% farmer depended on
Traditional flood irrigation



2) Rain Water Harvesting

- Check Dams, Contours Trenches, percolation Tank
- reduce Soil erosion, promote groundwater recharge.

3) Soil Moisture Management

- Mulching : Covering soil with organic material to retain Moisture
- Soil Moisture Sensor : Monitors soil Moisture to reduce Wastage.

David Molden = "Water for food Water for book
Light" = 30% water will be Conserved

4) Integrated Water Resource Management

- Community Involvement in water management Strategies

Issue of Indian Agriculture

1) Heavy dependency on Monsoon

- (50-60)% depend on monsoon.
 - Uncertainty in monsoon result in water scarcity.

2) Wastage of Water

- Due to poor irrigation System.
 - inefficient Water Management
 - eg: NABARD $\Theta = 40\%$ wasted water |
2022 report

3) Low Productivity

- inefficient irrigation system, drainage
eg India productivity is 6.6 Times & 2Times less than China (~~World Bank report~~
~~FAO report~~)

MAJOR POLICIES IN BUDGET

i) PM Dhumya Dhumya kaushi
Yojna

Technology Adoption

Investment in Drip irrigation

- Subsidies to adopt Drip Technique
- directly deliver water to plant root

Sprinkler System

- More uniform water distribution.
 - eg: govt subsidy By Bihar govt

PMKSY expansion

- Pradhan Mantri Krishi Sichai Yojna aim to improve irrigation infrastr^{ucture}

What Need To be done

i) Field Level water Management

ii) Smart Irrigation Infrastructure

iii) Use of AI in for effluent use of water.

iv)

Effective Water management
is vital for Sustainable practice. Through
education, govt support helps to address
challenges. By adopting effluent
Technologies, and implementing recommendation
of "Mihir Shah Committee" focusing on
promoting Sustainable use of water.