Indian Economy · GS - III

What are the present challenges before crop diversification? How do emerging technologies provide an opportunity for crop diversification?

EXAM YEAR	PAPER	SUBJECT
2021	GS - III	Indian Economy

MARKS	WORD LIMIT
15	~250 words

Answer Hint

Rice-wheat monoculture, groundwater depletion, soil degradation, climate change, MSP and procurement incentives, fragmented holdings, market access, pulses and oilseeds, precision agriculture, remote sensing, artificial intelligence, biotechnology, micro-irrigation, cold chains, digital agriculture

Model Answer

Introduction

Crop diversification refers to shifting from a narrow range of crops towards a broader mix suited to local agro-climatic conditions, markets and resource availability. It can improve farm resilience, nutrition and environmental sustainability.

Challenges to Crop Diversification

- **Policy incentives:** Assured procurement and price support for rice and wheat encourage farmers in some regions to continue monocropping.
- **Water stress:** Paddy and sugarcane cultivation in water-scarce areas can accelerate groundwater depletion.
- **Market uncertainty:** Farmers may hesitate to grow pulses, oilseeds, millets, fruits or vegetables when prices and buyers are uncertain.

- **Infrastructure gaps:** Inadequate storage, cold chains, processing facilities and transport increase post-harvest losses.
- **Small holdings:** Fragmented land and limited access to credit make new technologies and crop transitions difficult.
- **Knowledge and climate risks:** Farmers may lack information about alternative crops, suitable varieties and changing weather conditions.

Opportunities from Emerging Technologies

- **Precision agriculture:** Sensors, drones and satellite imagery help farmers optimise water, nutrients and crop management.
- **Artificial intelligence:** Predictive analytics can improve crop selection, pest management and yield forecasting.
- **Biotechnology:** Improved varieties can provide better disease resistance, climate tolerance and nutritional quality, subject to biosafety safeguards.
- **Digital platforms:** Online marketplaces and price information can connect farmers to buyers and improve price discovery.
- **Micro-irrigation:** Efficient water delivery can make alternative crops viable in water-stressed areas.
- **Protected cultivation and cold chains:** Greenhouses, controlled environments and improved storage support high-value horticulture and reduce losses.

Way Forward

Technology must be combined with diversified procurement, crop insurance, extension services, farmer-producer organisations, processing infrastructure and assured market linkages.

Conclusion

Crop diversification is not simply a technological change; it requires a shift in incentives, infrastructure and farmer confidence. Appropriate technologies can make this transition more productive and sustainable.

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