Geography · GS - I

The groundwater potential of the gangetic valley is on a serious decline. How may it affect the food security of India?

EXAM YEAR	PAPER	SUBJECT
2024	GS - I	Geography

MARKS	WORD LIMIT
15	~250 words

Answer Hint

groundwater depletion, Gangetic Valley, irrigation, food security, rice-wheat system, agricultural productivity, water-intensive crops, aquifer recharge, climate change, crop diversification

Model Answer

Introduction

The Gangetic Valley is one of India's most productive agricultural regions and a major contributor to national foodgrain production. Its dependence on groundwater makes declining aquifer levels a serious threat to agricultural sustainability and food security.

Impact on Food Security

1. Reduced irrigation availability: Groundwater supplements rainfall and provides reliable irrigation during dry periods. Its depletion can reduce irrigation during critical crop-growth stages.

2. Lower crop productivity: Water-intensive crops such as rice and wheat may experience declining yields if irrigation becomes inadequate.

3. Threat to foodgrain procurement: Major grain-producing states of the Indo-Gangetic region contribute substantially to public procurement. Production decline could affect buffer stocks and the Public Distribution System.

4. Rising cultivation costs: Deeper water tables require deeper wells and greater pumping energy, increasing farmers' input costs.

5. Food-price pressure: Reduced agricultural output could create regional supply shortages and contribute to food-price volatility.

6. Livelihood impacts: Small and marginal farmers, who have limited financial capacity to deepen wells or adopt alternative irrigation systems, may face disproportionate losses.

7. Climate vulnerability: Rising temperatures and irregular rainfall can increase irrigation demand and accelerate groundwater depletion.

Way Forward

Sustainable groundwater management requires aquifer mapping, artificial recharge, rainwater harvesting, efficient irrigation, crop diversification and improved water-use efficiency. Agricultural incentives should gradually encourage less water-intensive crops.

Conclusion

Groundwater depletion in the Gangetic Valley is therefore simultaneously an **agricultural, ecological and livelihood challenge**. Protecting India's food security requires shifting from groundwater-intensive agriculture towards sustainable and climate-resilient water management.

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