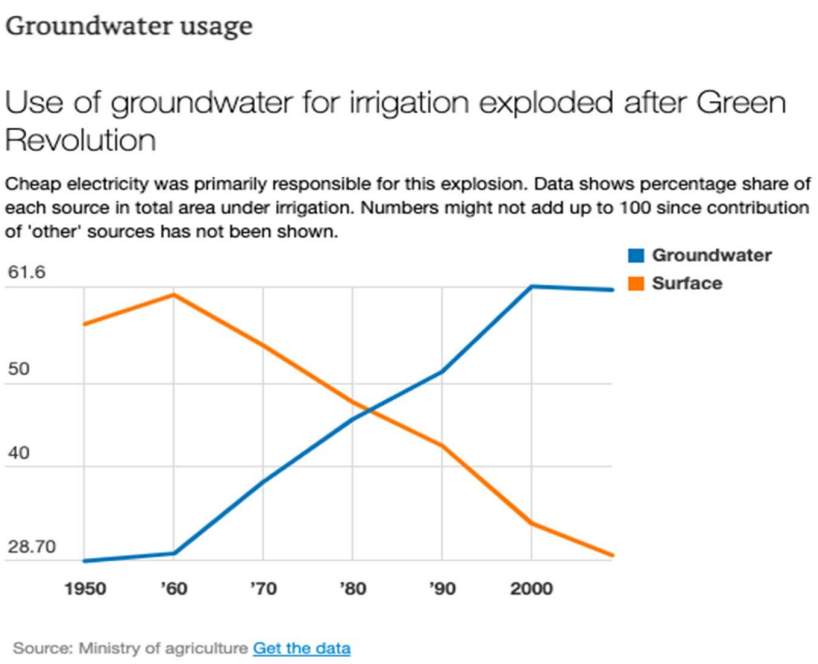
Name:

Farmer case study analysis worksheet

Learning outcome: Students assess the environmental and economic sustainability of a farmer's choice of crops from a case study based on what they have learned about soil and water requirements of different crops, and groundwater extraction patterns.

How do farmers decide which crop to sow? How do resources like soil, water, weather and other factors affect farming? How do market factors change cropping patterns? Let us understand farmers' perspectives! Please note that the farmer's narratives are a few representative cases. Let us also understand from an article in Mint- an e-paper, how dependence on groundwater has changed over the years, what the groundwater situation is today, and whether our current ways of using groundwater are sustainable or not.

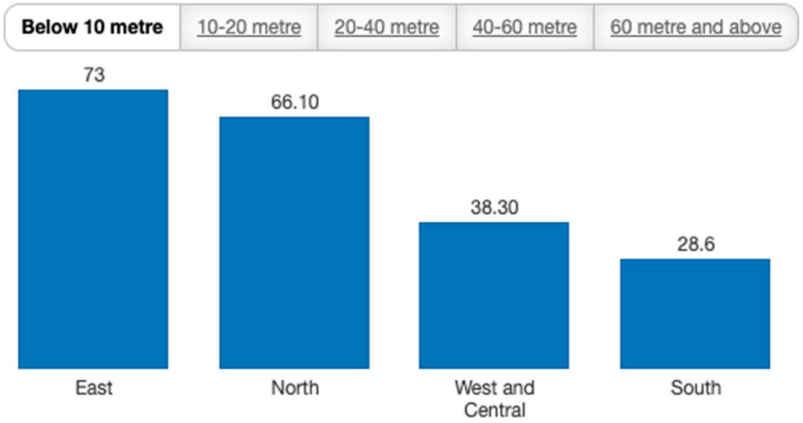


"Dependence of irrigation on groundwater [rather than surface water] increased with the onset of the so-called Green Revolution, which depended on intensive use of inputs such as water and fertilizers to boost farm production. [Instead of] extending surface water irrigation to unirrigated regions, policymakers began providing incentives for groundwater extraction."

Regional water-table

South, West and Central India have significantly lower water table than other regions

South has a frightening 30% of its groundwater table lower than 60 metres below the ground. Data shows percentage share of groundwater wells according to depth below ground.



Source: Ministry of water resources Get the data

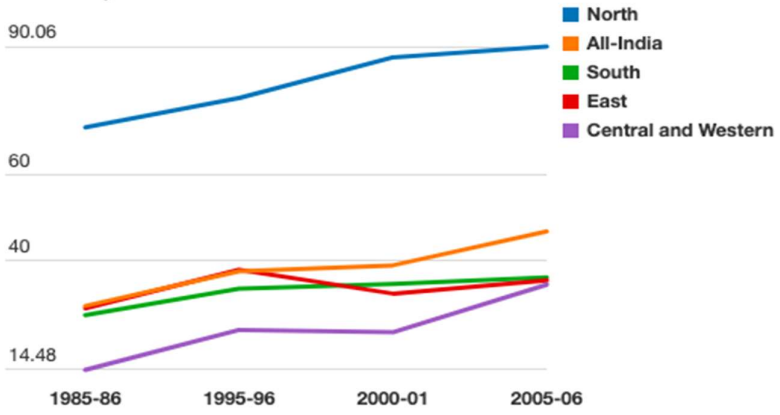
"Private groundwater irrigation was [encouraged] by extending credit (loans) and subsidies for irrigation equipment. However, the [most important component] of government policy has been the massive subsidy provided on electricity supply. Low power tariffs [have] led to excessive [ground]water usage, ***leading to a sharp fall in water tables. The rush to grow cash crops in recent years has only … [made] the crisis [worse]. Falling water tables prompted the use of expensive deep-water equipment, which added to the debt burden of farmers, and worsened the crisis [even more].***"

"The historical [unequal share of] electricity supply to different regions have also skewed cropping patterns [made them go out of balance]. [Because the water table in] … [Eastern India is relatively higher compared to other parts of the country, this region] is more suited to [the] growth of… crops such as sugarcane and paddy that have a high water requirement. ***However… [poor availability of] power has [resulted in these] crops, which require irrigation, … hardly [finding] a place [where it makes sense to grow them].*** *On the other hand, power freebies in the initial years in … [Southern and Western India]* ***—regions with naturally low water tables—encouraged sugarcane and paddy cultivation, sapping these regions of the already [low availability of] groundwater.***"

Regional inequities in irrigation

Regional disparities in irrigation in India

Data shows percentage share of net irrigation to net area used for sowing crops. North enjoys disproportionate advantage over other regions. East is the only region to have shown decline in share of irrigated area.

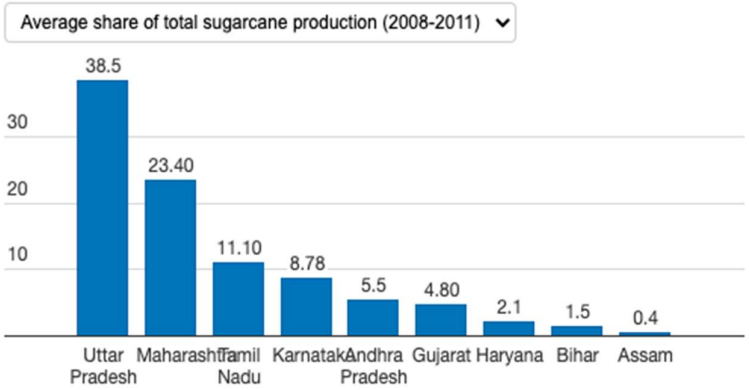


Source: Ministry of water resources Get the data

Sugarcane plantation

Sugarcane plantation growing in areas not naturally suited to the crop

Share of water-stressed Maharashtra in total sugarcane production has gone up by nearly 9 percentage points, while water-abundant states like Bihar and Assam have lagged behind



Source: Ministry of agriculture Get the data

https://www.livemint.com/Opinion/v4nXpXNxSJtxQNlEbvtJFL/Indias-groundwater-crisis.html

Farmer case study observations and analysis

Name of Farmer	Size of land-holding	Soil type and depth	Water sources		Crops sown				Other capital/income available, and your comments
			Surface	Ground	Crop name	Cropping season	No. of water-ings	Yield (approx if available)	

Based on your understanding of what you have learned about which crops are appropriate to grow in soils that have low or high water- holding capacity, and where the amount of groundwater available is low or high, please *assess* the environmental and economic appropriateness of your farmer's choice of crops from the case study given to you. *Please provide valid reasons for your answers based on what you have learned.*

1. What is the water- holding capacity of your farmer's soil? Is it high, medium, or low?

2. To what extent is your farmer dependent on groundwater for their crop choices? Explain.

3. Based on what you have learned so far, to what extent is your farmer's choice of crops environmentally and economically appropriate? *Explain your reasoning.*

4. Suggest some alternative crops for each cropping season (rabi, kharif and zaid) that you think could be more environmentally and economically sustainable for your farmer. *Explain your reasoning.*