

# Future food security and water in Pakistan

Nearly half the people in Pakistan do not have access to enough food of the right nutritional quality, and even this inadequate food supply relies on unsustainable groundwater use for its irrigation. More food for more people in the future will require some or all of:

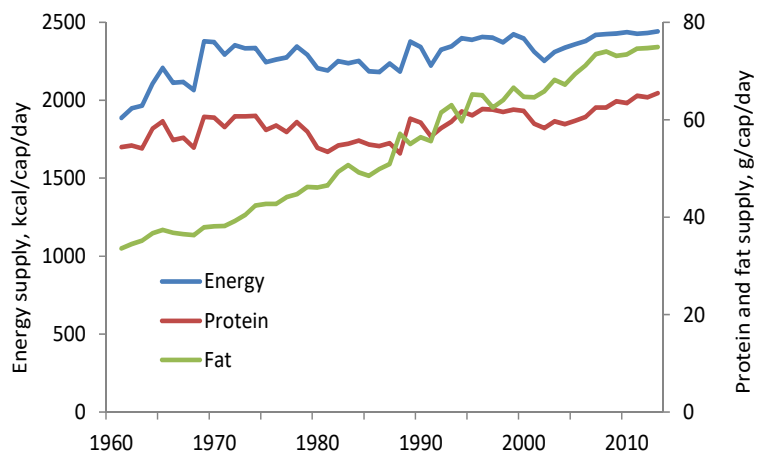
- continued depletion of groundwater with a risk of exhausting some resources
- building new dams
- developing higher yielding crops through more intensive research
- swapping to crops and irrigation systems that use less water to provide food
- importing large quantities of food.

## Past trends and current situation

Nearly half the people in Pakistan do not have access to enough food of the right nutritional quality [1] despite an adequate average per capita food availability of about 2400 kCal per person per day (energy supply, Figure 1). The diet of the average Pakistani is changing, with consumption of more animal fats, but the average per capita calorie consumption has grown little in the last 50 years (protein and energy supply, Figure 1).

As the population has grown, the area of irrigated cropping has expanded. Crop yields have also increased. Pakistan's production of many foodstuffs, including wheat, other grains, sugar, fruit, vegetables, meat and milk has kept up with or exceeded the growing demand in the last 50 years. This has led to declining imports of wheat and growing exports of rice. The production of pulses and oilseeds has not kept up with demand, and they are increasingly imported.

The challenge is to meet future food and water requirements of a growing Pakistan.



**Figure 1 The changing Pakistan diet: more fat on average, with modest increases in energy and protein. Although there is enough energy (kilocalories) on average, nearly half the population gets inadequate nutrition. Source: [2]**



Photo credit: MD Ahmad



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## The challenge: meeting the requirements of future trends in food and water

The population of Pakistan is projected to grow from the current estimated 210 million to perhaps 270 million by 2050. Increasing the area of irrigated cropping and crop yields in line with past trends will continue to provide food at about the current level of adequacy – so many will still be malnourished.

But increasing the area of irrigation in line with past trends implies that more water will be required. And, without careful planning and building of new dams, this will inevitably mean using more groundwater. This practice is likely to lead to adverse salinisation of some of Pakistan's groundwater aquifers. The few estimates of the total volume of usable groundwater suggest that the increased rate of groundwater use could exhaust the best quality groundwater in as little as 50 years (Figure 2).

### The choices

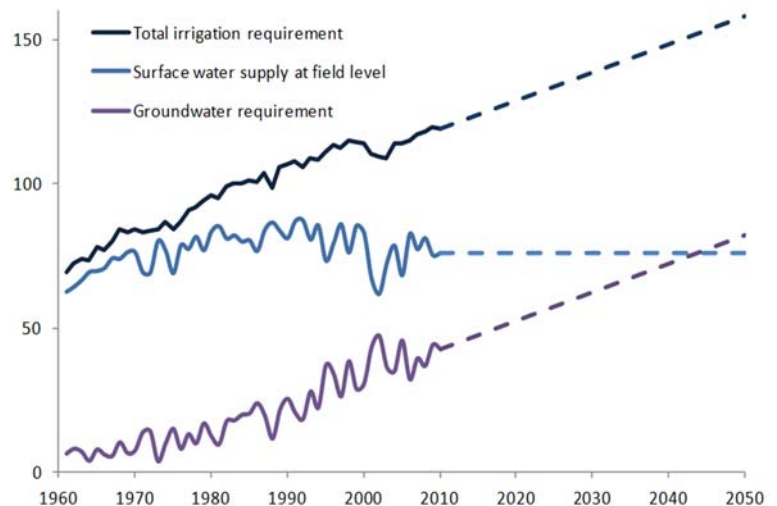
Increasing the rate of depletion of groundwater carries a risk of exhausting some resources, but appears inevitable in the absence of other policies or adaptations.

Building new dams is one alternative, but will require breaking current inertia. A large dam will take many years to plan and build.

Crop yields will continue to rise, but accelerating the rate of increase will require investing in more intensive research and development.

Growing less rice, sugar and cotton (all high water use crops) would save water for use in growing food.

Water could also be saved if large quantities of food were imported rather than grown domestically.



**Figure 2** Historical (to 2013) and projected (2013 to 2050) total irrigation requirement, surface water supply to the field, and groundwater requirement, in billion cubic metres (bcm). The groundwater requirement shows the probable increasing requirement in the absence of alternative policies and adaptations. Source: Authors' calculations based on figures from [3] and [4] for 2007.



Photo credit: MD Ahmad

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### References

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[2] FAOSTAT food balance sheets <http://faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor>

[3] Cheema MJM (2012) Understanding water resources conditions in data scarce river basins using intelligent pixel information: transboundary Indus Basin. Doctoral Thesis, Technische Universiteit Delft.

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