

Crop area trends in the northwest region of Bangladesh from 1985 to 2016

During the last few decades, there has been a great increase in the area planted to *Boro* rice, and a large decrease in the area of *Aus* rice. The areas of many other crops have also changed. These changes have impacted the volumes of groundwater withdrawn for irrigation. Understanding these changes and the impact on groundwater is crucial to understanding the sustainable level of groundwater use for irrigation in the northwest region of Bangladesh, and to developing strategies for its sustainable use.

Developing sustainable groundwater management strategies for the northwest region will help increase water and food security in Bangladesh, through improved integrated water resource management and agricultural (hence food) production. This will increase food security and economic prospects, especially amongst the poorest, and this in turn would have significant benefits for women and girls.

Background

The northwest region has the largest areas of cropping in Bangladesh and is crucial to Bangladesh's recent attainment of rice grain food security. The northwest region alone supplies about 35% of the irrigated *Boro* rice and more than 60% of the wheat and maize of the whole country. The northwest region is also the region of greatest concern over falling groundwater levels, particularly in the Barind area, which have resulted in a lack of access to water for drinking and irrigation in some areas. However, it is not clear whether the declining groundwater levels result from an observed decline in rainfall, or from excessive use, or from some combination of these and possibly other factors.

To address this challenge, the Australian Government, through its Department of Foreign Affairs and Trade (DFAT) Sustainable Development Investment Portfolio, is funding a project involving CSIRO and several Bangladeshi partners.

The project aims to define the sustainable level of water (particularly groundwater) use for irrigation and their impacts on the socio-economy and livelihood of the farmers including women in the northwest region of Bangladesh.



Figure 1 Irrigating *Boro* rice from groundwater in northwest Bangladesh

An important part of this aim is to understand the areas under different crops, and how these areas have changed over the last few decades.

Areas of major crops and crop types

The areas of crops was obtained from agricultural survey data in Bangladesh, particularly the records available in the Yearbook of Agricultural Statistics, published annually by the Bangladesh Bureau of Statistics. The yearbooks contain statistics for many crops, both major (such as rice) and minor (such as cabbages). We grouped the minor crops into several main crop types with similar water use characteristics.

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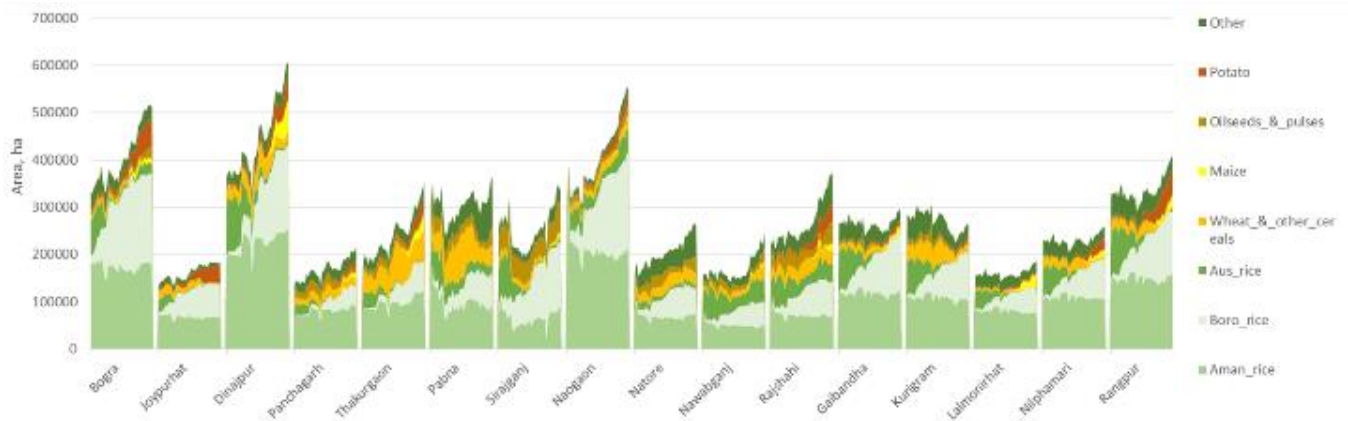


Figure 2 Change in areas of crops over the period 1979-80 to 2015-16, by district

The crop area statistics are available for the 16 current districts of northwest Bangladesh from 2006, and for the same crops for the five former districts from 1979-80 up to 2005-06. The data up to 2004-05 have been disaggregated from the five former districts to the 16 current districts.

Figure 2 shows that overall area under crops increased from 1979-80 to 2015-16 in most of the districts in northwest Bangladesh. However, there was no increase in cropping area in Kurigram, and only modest increases in the total area in Pabna, Gaibandha, Lalmonirhat and Nilphamari.

In all districts there has been a large increase in the area under *Boro* rice, and a decline in the area under *Aus*. Rice accounted for between 49 and 84 % of the total cropped area of districts in 2015-16. Other crops are grown in smaller areas in all districts, and their importance varies from district to district. Wheat is important in Pabna and Thakurgaon; maize is important in Dinajpur; potatoes are important in several districts including Bogra and Joypurhat; oilseeds are important in Sirajganj and Rajshahi.

Implications for groundwater

The large increase in the area of *Boro* rice is important for groundwater sustainability, since *Boro* depends primarily on irrigation, whereas *Aman* and *Aus* rice are partially if not mainly rainfed.

The crop area data are being used in district water balance modelling and in detailed groundwater modelling, to understand the relative impact on

groundwater use of changes to crop area and changes to other factors such as rainfall.



Figure 3 Northwest districts (shading indicates different hydrological zones)

Project partners

1. Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Lead)
2. Institute of Water Modelling (IWM)
3. Bangladesh Agricultural University (BAU)
4. Bangladesh Agricultural Research Institute (BARI)
5. Barind Multipurpose Development Authority (BMDA)

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The CSIRO SDIP project team maintains an up-to-date website for sharing material and news on project activities
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