

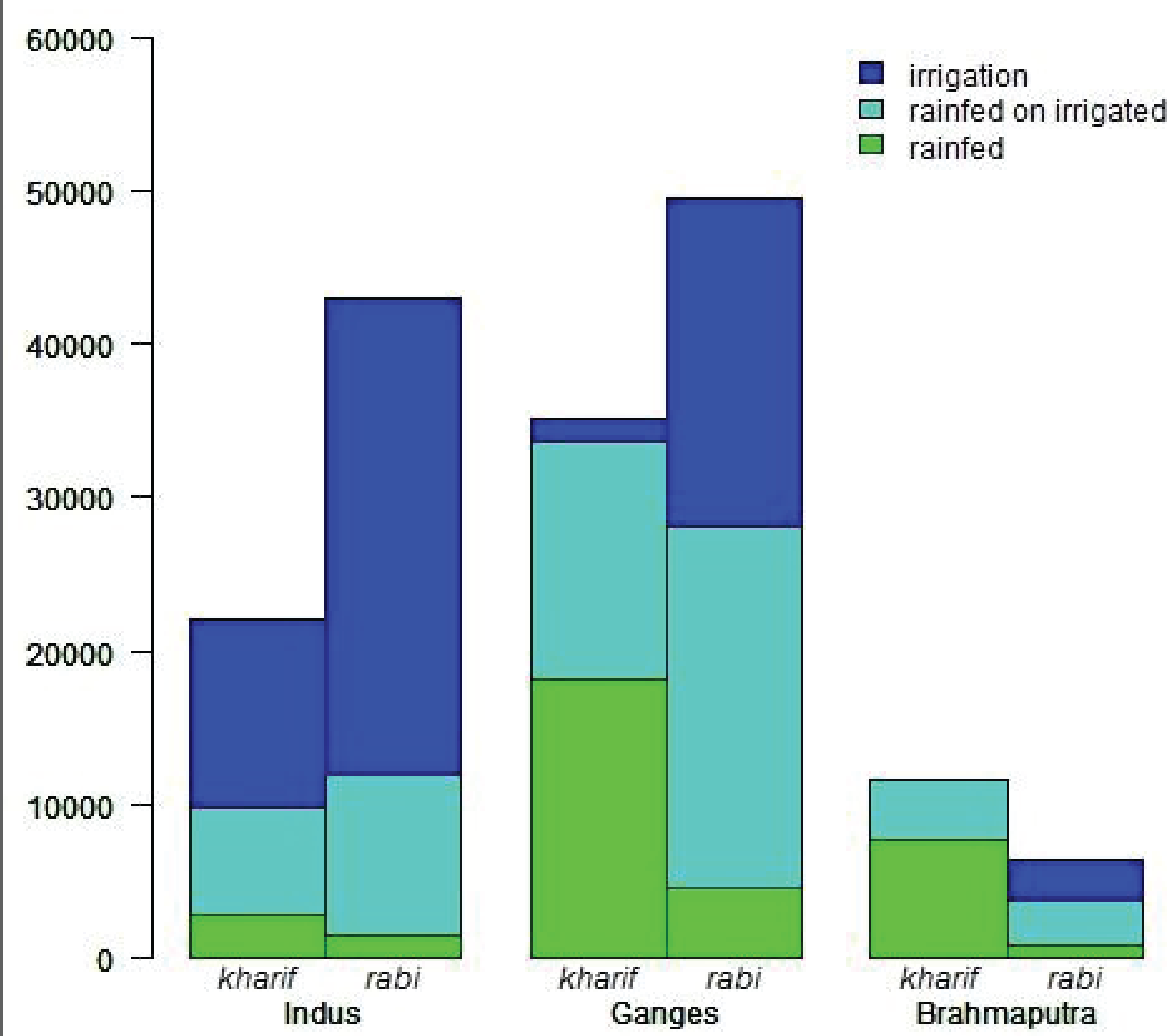


In the Hindu Kush Himalaya, 130 million farmers in the downstream plains of the Indus and the north-western part of the Ganges basin depend on water originating from glacier and snow melt from the mountains.

Discharge from glacier and snow melt and groundwater provide a reliable supply of irrigation water during parts of the growing season when other water sources are scarce. Any changes in the future availability of meltwater or further groundwater depletion will therefore impact agriculture.

## WATER TOWERS

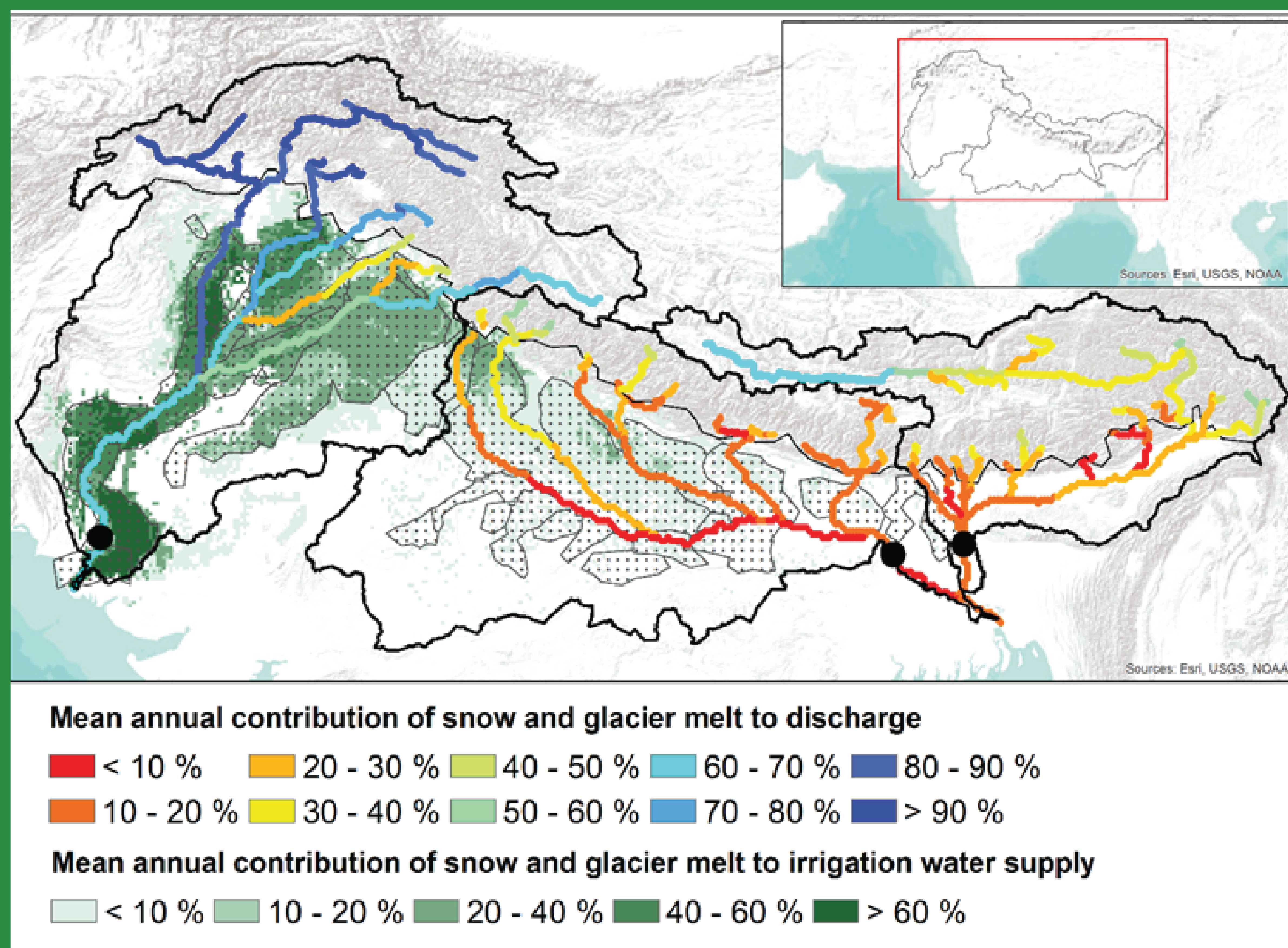
A constant supply of water for irrigation in the plains results from the unique interplay between seasonal snowmelt in spring, glacier melt rising during the Asian summer months and into the monsoon season when rainfall starts to contribute, with slowly recharging groundwater resources supplementing shortfalls in supply throughout the year. The vast amounts of water stored as snow and ice make the mountains **Asia's 'Water Towers'**.



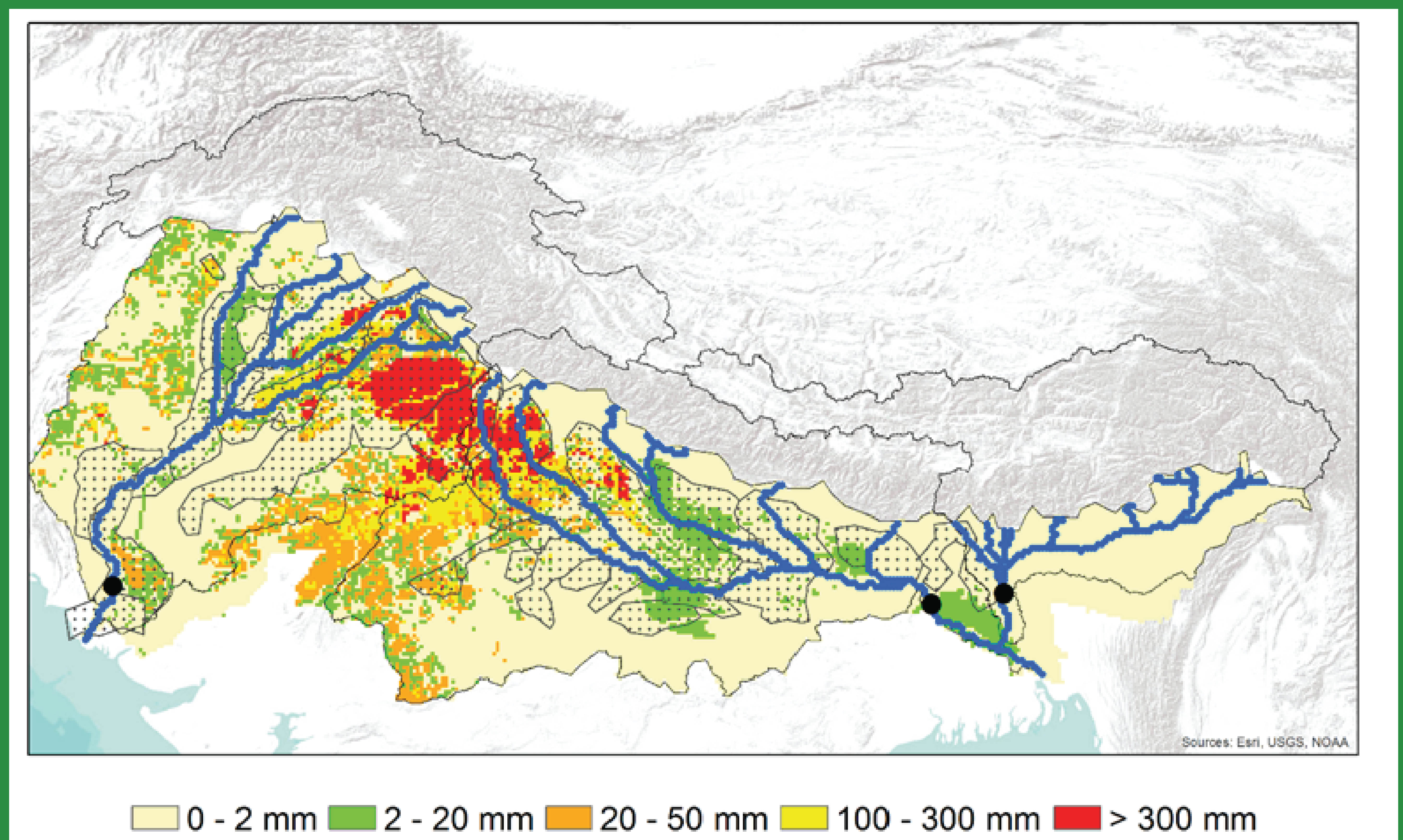
Mean annual seasonal irrigated (blue) and rainfed (green) production of food crops (sum of wheat, rice, maize, tropical cereals and pulses) in South Asia (Nepal, Pakistan, India and Bangladesh) and individual river basins. Light blue corresponds to potential rainfed production on irrigated land, i.e. dark blue corresponds to the increase in production due to irrigation.

## FUTURE PROJECTIONS

Contribution of snow- and glacier-melt to irrigation



Mean annual groundwater depletion due to groundwater extraction



We have shown that cotton and rice production in the Indus basin, and sugarcane production in the north-west Ganges basin are largely dependent on snow and glacier meltwater, whereas groundwater is mostly tapped for wheat production. This implies that any shift in the timing or amount of meltwater will affect production of cotton and rice, and that a change in sowing date or crop type might be the best adaptation solution.

Any reduction in the future availability of meltwater will impact crop production, and necessitate adaptive measures such as changes in sowing dates or crop types.

