Climate Change and Food Production Scenarios in the Teknaf Peninsula of Bangladesh

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Background

Bangladesh is a vulnerable country to climate change because of its disadvantageous geographic location; flat and low-lying topography; high population density; high levels of poverty; reliance of many livelihoods on climate-sensitive sectors, particularly agriculture, forest and fisheries; and inefficient institutional aspects. The Teknaf peninsula is situated in the southeast corner of Bangladesh, where agriculture, forest and coastal ecosystems are found in a narrow area, which are being degraded due to various anthropogenic activities and climatic phenomena.

Major Questions

- Is climate in terms of rainfall, drought and temperature changing in the Teknaf peninsula?
- What are the existing agricultural production systems?
- Is climate change affecting agricultural production?

Methodology

Study area: The Teknaf peninsula of Bangladesh.

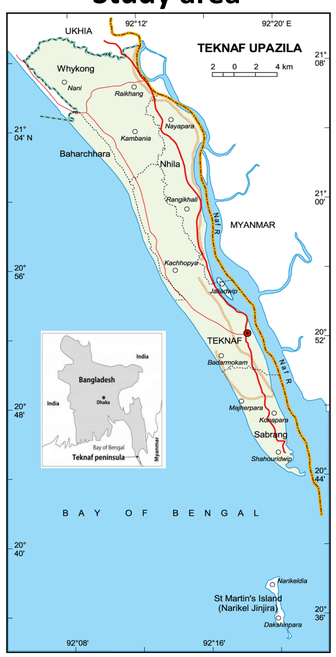
Data collection: Rainfall and temperature data were collected from Bangladesh Meteorological Department. Agricultural data were collected from Department of Agricultural Extension.

Draught measurement:

The Standardized Precipitation Index (SPI) is widely used as direct approach in comparison with other drought indices because of its simple and useful application. SPI was calculated as

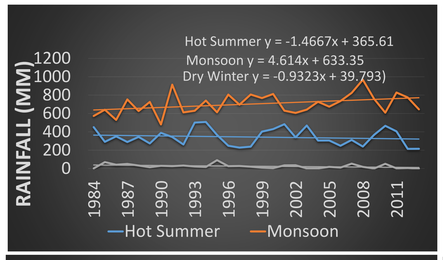
$$SPI = \frac{Xi - \overline{X}}{\sigma}$$

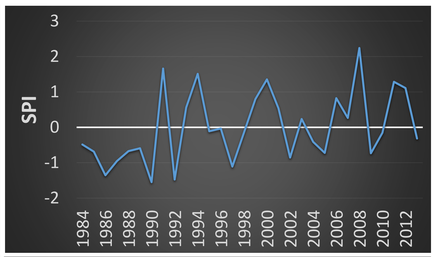
Study area

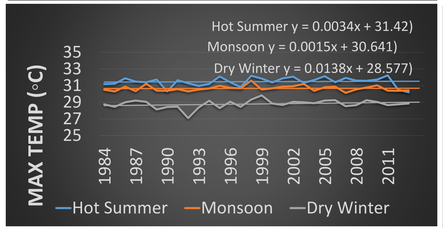


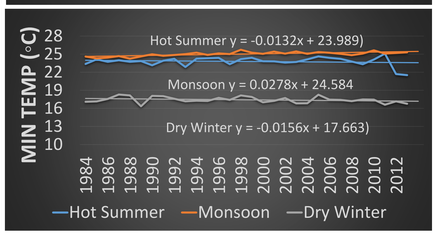
Findings

Trends in rainfall, drought and temperatures



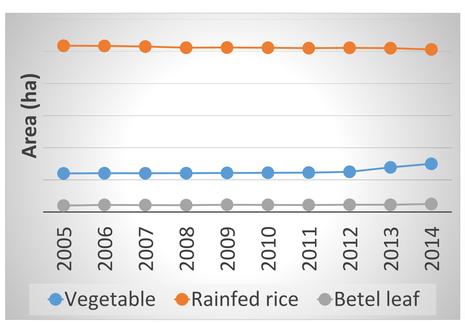


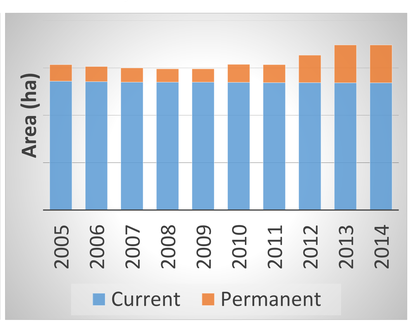




Long-term (1984-2013) weather data show that annual rainfall (around 4000 mm) did not change remarkably, but its distribution has been changed. Monsoon rainfall increased by 4.6 mm/annum, while it decreased by 1.5 and 0.9 mm/annum during hot summer and dry winter, respectively. As a result, prolonged drought is being observed. The standardized precipitation index (SPI) showed frequent drought events in recent years. Overall temperature shows an increasing trend, however, annual increment of maximum temperature is relatively high (0.014 ◦C) during winter season.

Land distribution for major crops and fallow (current and permanent) land

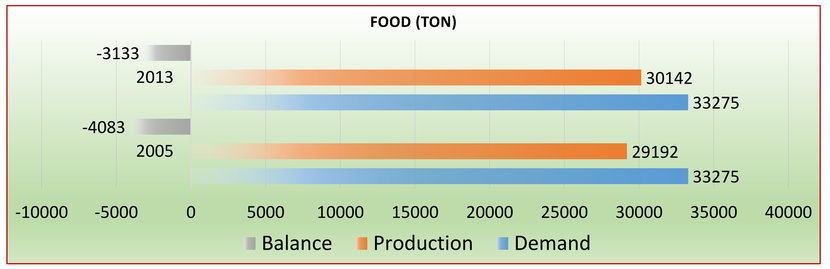




More than 70% lands are used for rainfed (*aman*) rice cultivation followed by vegetables (20%).

Current fallow land has decreased slightly, while permanent fallow land became more than double in the last 10 years. At present total fallow lands are about 7% of total landmass. Total cultivable land was 13840 ha in 2005, which decreased to 13728 ha in 2013. Cropping intensity also decreased from 174% to 166% in the same period. The average yield of *aman* rice is 2.5 ton/ha, which is lower than the national average (2.8 ton/ha).

Food production, demand and balance



Although the gap between food demand and production has decreased in 2013 compared to 2005, still the area is shortage of food by 13%.

Draught effects

Although annual rainfall did not change, its monthly distribution has been changed the fact that affects rainfed rice (June through October), which accounts 93% of total rice area. Late rain delays rice transplanting and harvesting that hampers crop production in the following season. Winter vegetables and betel leaf are two major crops and their productivity are gradually decreasing due to prolonged drought.

Conclusion

Drought is a common event in recent years. Rice area has decreased due to high production cost and uncertainty of rain. Although food production in Teknaf has increased due to introduction of new varieties and technologies, that is no longer sufficient. Therefore, suitable technology, adaptation and mitigation strategies should be undertaken for increasing food production in the Teknaf peninsula.

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