

## ABSTRACT

The coastal region covers almost 29,000 km<sup>2</sup> or about 20% of the country and more than 30% of the cultivable lands of the country. About 53% of the coastal areas are affected by salinity. Agricultural land use in these areas is very poor, which is much lower than country's average cropping intensity. Salinity causes unfavorable environment and hydrological situation that restrict the normal crop production throughout the year. The dominant crop grown in the coastal region is local transplanted Aman rice crop with low yields. The cropping patterns followed in the coastal areas are mainly Fallow-Fallow-Transplanted Aman Rice. IPCC estimates predict that due to the impact of climate change, sea level in Bangladesh may rise by 14 cm by 2025, 32cm by 2050 and 88 cm by 2100. Salinity is a current problem, which is expected to exacerbate by climate change and sea level rise. Salinity intrusion due to reduction of freshwater flow from upstream, salinisation of groundwater and fluctuation of soil salinity are major concern of Bangladesh. Cyclones and tidal surge is adding to the problem. Tidal surge brings in saline water inside the polders in the coastal area. Due to drainage congestion, the area remains waterlogged that impede improved land productivity and food security. Agriculture is a major sector of Bangladesh's economy and is true for the coastal area of Bangladesh. Increase in salinity intrusion and increase in soil salinity will have serious negative impacts on agriculture. Presently cultivated rice varieties may not be able to withstand and produce optimum yield with the increased salinity. The food production does not seem to have a better future in the event of a climate change. In Bangladesh, rice production may fall by 10% and wheat by 30% by 2050 (Climate change in Asia 'too alarming to contemplate'-report, IPCC, 2007).

To combat the above adverse effects and also to develop climate resilient agriculture for the coastal regions of Bangladesh, BRAC had implemented a gigantic study in the coastal regions of Bangladesh with the financial assistance from the European Union. For this study, data were collected from the block demonstration implemented by BRAC, analyzed and compared with the local farmers' practices. It was observed that average yield of local rice was about 2.4 t/ha. The yield of improved high yielding varieties (HYV) of rice (inbred and hybrid) demonstrated by BRAC with farmers' participation was 2-3 times higher than local rice, mostly due to more number of effective tillers per hill meaning more number of plants per unit area, longer panicles and more filled grains per panicle that was observed in improved varieties over the traditional rice varieties cultivated by the farmers. Yield of hybrid rice was 1-2 t/ha higher than HYV rice, and about 3-4 t/ha higher than traditional rice varieties cultivated by the farmers.

The cropping intensity was increased from 178% to 280% due to the project intervention. Major shift from local to improved variety is noted. Several new crops are introduced and intensity of crops is increased in all cases. Average yield has increased due to varietal improvements. Yield increased up to 250% in case of hybrid paddy of Alloran in comparison with other local (Godaila, Moinamati) varieties. Hybrid and HYV crops suitable for plain land as well as suitable for selected coastal areas may change cropping patterns, cropped area, cropping intensity, yield, production, and income. This will help in better resilience of the coastal farming communities in combating disasters arising from the climate change phenomenon.

There are some areas in Barisal division where three rice crops can be cultivated by utilizing rainfall and river water. The farmers could get an annual production of about 18.0 t/ha by investing about BDT 120,000 per ha per year. With such investment they can earn about BDT 316,000 per ha annually. In areas, where sufficient water was not available for boro rice cultivation, the farmers cultivated different rabi crops by adopting aus-aman-rabi pattern, as rabi crops are less water demanding and can tap residual soil moisture better for their growth and development. The farmers of Kachua, Barguna sadar, Jhalokathi sadar, Patuakhali sadar

and Nazirpur upazilas harvested an annual production of 12-18 t/ha by adopting (a) Rice-Rice-Maize, (b) Rice-Rice-Sunflower and (c) Rice-Rice-Mungbean patterns in Aus, Aman and Rabi seasons. Water resources in these upazilas are favourable for three crop cultivation (two rice and a rabi crop). By investing an amount of BDT 94,600-116,700 per ha in a year, the farmers could get an annual income of BDT 249,700-324,800 per ha.

Therefore, in a populace and land-scarce country like Bangladesh, cultivation of hybrid rice should be promoted to achieve food security when climate change is supposed to pose serious threat to our agriculture, especially in coastal regions of the country. In water scarce areas like the coastal regions of Bangladesh, maize could an alternative option to be pursued in the rabi season for higher productivity and income. Sunflower can also be adopted as rabi crop in the water-scarce coastal regions of Bangladesh for not only to meet-up edible oil requirement, but also for higher farm income and also to save foreign currency by reducing import of edible oil.

To improve resilience of the coastal farming communities, some measures could be taken to increase cropping intensity and food security in the coastal salinity areas of Bangladesh. Firstly, fresh/non-saline river water should be conserved in the polder canals to irrigate boro/rabi crops. Secondly, single and double crops areas could be converted to double/triple crop areas by utilizing residual soil moisture, non-saline river water and conserved fresh water from the canals inside the polders and by introducing short duration and high yielding stress tolerant crop varieties. Thirdly, dissemination of appropriate modern and climate resilient technologies through block demonstration should be promoted to achieve food security of the coastal communities.