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Adaptation of High Yielding Soybean in Polder Areas in Barguna and Patuakhali Districts

Out of 2.85 million ha of land in the coastal and off-shore zone of Bangladesh about 0.828 million ha is arable, which constitutes about 52.5% of the net cultivable area in 64 upazilas of 13 coastal districts. This large area is vulnerable to the hazards of climate change.

About 30-50 % of the net cultivable area in the coastal zone remains fallow in rabi (winter) and *kharif*-I (pre-monsoon summer) seasons due to soil wetness/waterlogging, tidal surges, late harvest of transplanted *aman* (*T. aman*) rice, drought and soil salinity, incursion of shrimp fields, etc. Polders have been built since the early 1960s to protect land and people from tidal flooding and saline intrusion. Today's network of 124 polders of varying sizes extending up to 100 km inland, provides a first line of defense for millions living in Bangladesh's coastal belt.

Agricultural lands in the polder areas are affected by varying levels of salinity (2.0 - 8.0 dS/m). *T. aman* rice-fallow-fallow is the most dominant cropping pattern in polder areas, but there are good opportunities for growing suitable salt tolerant crops in the fallow periods. Soybean is a leading oil seed crop in the world and can tolerate salinity to some extent.

It is also an important legume because of its high protein (35%) and oil (21%) contents and nitrogen fixing ability (17-127 kg N ha/yr). It can be a good source of protein and fat to fight malnutrition among poor people in the country. Besides edible oil, soybean can provide other food items like soy milk, soy flour, etc. and ingredients of animal and poultry feed. Introduction

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of soybean into the existing cropping patterns in the polder areas may be a good way of optimizing land utilization in the areas for the development of coastal agriculture to improve food security, health and nutrition of the vulnerable farming community in the coastal region of Bangladesh.

This project was designed to test and popularize an alternative cropping pattern, *T. aman*-soybean-fallow, with the introduction of high yielding varieties of soybean to increase the cropping intensity and enhance system productivity in southern coastal zone of Bangladesh. The work involved selection of high-yielding soybean varieties suitable for the polder areas of Barguna and Patuakhali districts, development of appropriate management practices for soybean cultivation and improving farmers' knowledge and skills regarding production practices of soybean and HYV *T. aman* rice in the polder areas.

It was a collaborative project implemented jointly by Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) & Patuakhali Science and Technology University (PSTU). Field trials were conducted in a participatory approach in farmers' fields of polder areas in Amtali upazila and Kalapara upazila of the districts of Barguna and Patuakhali, respectively. High yielding varieties (HYV) of soybean were grown in the rabi (winter) season following *T. aman* rice in a *T. aman*-soybean-fallow cropping pattern.

A total of 100 farmers in the two upazilas were involved in the research and training activities of the project. The alternative cropping pattern, *T. aman* rice-soybean- fallow was tested against the farmers' existing cropping pattern, *T. aman* rice-fallow-fallow. Three separate trials were conducted in selected farmers' fields to identify the best variety, best fertilizer doses, optimum sowing date and suitable tillage practice for cultivating soybean.

Four soybean HYVs, Shohag, BINA Soybean 1, BARI Soybean 5 and AGS 313 (advanced line) and three fertilizer doses (N, P, K, S) were tested.

The experiments yielded the following practically useful information:

- The variety, Shohag is suitable for growing in the polder areas of southern coastal Bangladesh
- Mid- December is the best time for soybean sowing
- Tillage is an important factor for soybean cultivation

- Fertilizers at the rates of 75-190-135-130 kg/ha of urea, TSP, MoP, gypsum, respectively, are appropriate doses for soybean in these polder areas
- The short-duration rice variety, BRRI dhan49, may be a good choice for growing in the *T. aman* rice preceding soybean

- Cultivation of soybean may improve soil health
- Cropping intensity can be increased by 18% through the incorporation of soybean in the cropping pattern
- Farmers' incomes can be increased and livelihood improved through the introduction of soybean in polder areas

Recommendations

Strong extension measures to disseminate and popularize the new technology of alternative cropping pattern including HYV soybean in all other polder areas of the coastal zone of Bangladesh should be taken to increase system productivity and enhance farmers' incomes.

Expected Impacts

Soybean cultivation in a t. aman-soybean-fallow cropping pattern has a good prospect of increasing cropping intensity and system productivity, enhancing farmers' incomes and improving their health and nutrition in the coastal zone of Bangladesh.

This bulletin has been prepared on the basis of technical information available from a completed CGP project of KGF, the details of which are given below:

Project code and title: TF 03 C: Adaptation of high yielding soybean in polder areas in Barguna and Patuakhali districts; Principal Investigator: Prof. Dr. Md. A. Mannan, BSMRAU; Project duration: May 2013-May 2015

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