

TECHNICAL BULLETIN

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Management Practices for Crop Production in Char Areas

A char is a newly established land, formed by river sediment accretion, in a river basin. With a total area of about 1,722 sq km in Bangladesh, chars are divided into five sub-areas: the Jamuna, the Ganges, the Padma, the Upper Meghna and the Lower Meghna rivers. There are other areas of riverine chars in Bangladesh, along the Old Brahmaputra and the Tista rivers, but compared with the chars in the major rivers, these constitute much less land area. About 6.5 million people (4% of the country's population) live in 0.725 million ha of chars which are one of the most susceptible agro-ecosystems in the country and are home to some of the poorest people. The char dwellers mainly depend on agriculture and agriculture-related activities, as opportunities for off-farm activities are very minimum there. The char areas are characterized by low soil fertility, and are vulnerable to erosion and floods. The sandbars remain unused and barren because of their infertile, sandy nature. Some proven technologies including organic amendments like biochar and household waste compost can be innovative practices for efficient utilization of the abandoned or underutilized char lands. Some crops like white gourd, bottle gourd, pumpkin, etc. can be grown profitably. These technologies need to be validated and disseminated for use in the char areas of Bangladesh. This KGF sponsored project was designed to evaluate new technologies for enhancement of productivity through innovative soil management practices, disseminate the most suitable and sustainable management technologies for crop productivity in char areas.

Methodology

The project was implemented jointly by the Department of Soil Science and Department of Agricultural Extension and Rural Development, BSMRAU with the assistance of an NGO, Society for Sustainable Development in Rural and Urban Area (SSURDA). Project work was done in Char Shaluka of Sariakandi upazila in Bogura district, Naobhangar Char of Jamalpur Sadar upazila in Jamalpur district and Majbari Char of Kazipur upazila in Sirajganj district which are located in the Jamuna and Brahmaputra river



Fig. 1. A sweet potato experimental field on a char land



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basins. A benchmark survey was conducted on 150 respondents (50 from each location) to evaluate the socio-economic conditions of the char dwellers and their crop production status and techniques. Farmers' field trials were conducted on nutrient management with combinations of recommended chemical fertilizers and organic matter. Six different nutrient management treatments viz., T1 = FP (farmers' practice) as the control treatment, T2 = RF (recommended fertilizers as per the BARC Fertilizer Recommendation Guide, 2021) + vermicompost (Vc @ 3t/ha), T3 = RF + quick compost (Qc @ 3 t/ha), T4 = RF + standard organic fertilizers (SOF @ 3t/ha), T5 = RF + poultry manure (Pm @ 3t/ha) and T6 = RF + biochar (Bc @ 3t/ha). Five field trials were conducted in 54 participating farmers' fields (18 farmers from each location) at the three project sites. Char farmers were trained on innovative soil and crop management practices at the three sites. Before setting up the field trials surface (15-30 cm depth) and sub-surface (15-30 cm depth) soil samples were collected from the three sites and analyzed for pH, organic C, total N, available P, available S and Zn (mg/kg) and CEC by following the standard analytical methods. Also, post-harvest soil samples were collected from the same depths and analyzed for the same properties. The test crops were pumpkin, sweet potato, millet, red amaranth, Indian spinach, okra, snake gourd. Crop yield data were collected and analyzed statistically.

Results and Outputs

Baseline surveys indicated low cropping intensity, traditional crop production techniques in the char areas and poor socioeconomic profiles of the char dwellers. The char soils were found to be slightly acidic (pH 5.64-5.95) having very low to medium levels of micronutrients. Organic amendment improved soil chemical properties (OC, CEC, N, P, S, Zn, etc.). Agronomic observations indicated a good possibility of growing some crops.

Chemical-organic combinations of nutrients markedly affected yield components and yields of the vegetable crops across the experimental sites on the three chars. Polutry manure was most effective in this respect followed by biochar and quick compost. For example, snake gourd gave a high yield of around 29 t/ha with the (RF+Pm) or (RF+Vm) combination while the yield was only about 17 t/ha in control. The Indian spinach yield ranged from about 50 t/ha (control) to 74 t/ha with (RF+Pm) or (RF+Vm) (Fig. 2). Okra, too, gave the highest yield of about 21 t/ha with Pm compared with 15 t/ha in control. For pumpkin and yellow sweet potato , Pm, Vm, Qc or Bc was equally effective. Biochar and poultry manure treatments showed higher yields (37.8-71.7.0%) and BCR (27.6-191.0%) as compared to farmers' practice.



Fig. 2. Influence of organic amendments on the growth of Indian spinach in Char Majbari

Expected Impact

The soil-crop management technologies developed by the project have the potential to substantially increase vegetable production in the underutilized, low-fertility soils of the char areas of different river basins of Bangladesh. This will have a positive impact on the nutrition of the impoverished char dwellers, and create opportunities of cash incomes for them.

Recommendations

- Integrated nutrient management with special emphasis on poultry manure and biochar should be promoted as a technology for soil health improvement and crop production in char areas.
- DAE and NGOs should take initiatives for agricultural land use intensification in char areas to improve the char dwellers' socioeconomic conditions.

This technical bulletin has been prepared on the basis of technical information available from a completed BKGET-KGF Funded CGP Project the details of which are given below:

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