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SOIL RESOURCE DEVELOPMENT INSTITUTE

MINISTRY OF AGRICULTURE

MRITTIKA BHABAN, FARMGATE, DHAKA-1215

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Executive Summary

Soil Resource Development Institute (SRDI) has engaged in cutting-edge science to generate soil management technologies to boost farmers' income and achieve sustainable development goals (SDGs). This report reveals achievements of SRDI regarding soil and land management that can be practiced in agriculture sector to enhance soil fertility and productivity and research that were undertaken to improve soil health in vulnerable agro-ecological regions of the country with a view to ensuring food security in Bangladesh.

SRDI seeks for developing soil and land management technologies that are cost effective, valid, replicable over time, applicable across different agro-ecological zones and most importantly effective in maintaining soil health.

This year SRDI implemented two special activities (i) Fertilizer recommendation card (FRC) distribution and (ii) Fruit and vegetable seedling distribution throughout the country to celebrate the 100th Birth Anniversary of the Father of the Nation of Bangladesh, Bangabandhu Sheikh Mujibur Rahman. The institute distributed 54,105 Fertilizer Recommendation Cards and 60,000 Fruit and vegetable seedling among the farmers.

Updating of "Upazila Nirdeshika" through semi-detailed soil survey is a core program of SRDI. In the fiscal year 2020-21, updating soil survey program was carried out at 48 Upazilas where significant changes in land cover/land use, land type, water recession, drainage and irrigation classes were identified in most of the Upazilas. It is also observed that high value crops along with vegetables have been incorporated in the cropping patterns as well. A number of thirty-five (35) Upazila Nirdeshika were published according to the updated soil and land information. It is also evident that agricultural land is shifting to non-agricultural purposes due to rapid industrialization and urbanization and rural settlements. Lowland as well as very lowland has reduced due to declination of inundation depth. Soil pH as well as soil nutrient status have been decreasing in different parts of the country due to increasing cropping intensity and widespread imbalanced fertilization application. Nutrient mining is evident in areas with higher cropping intensity.

Union based Land, Soil and Fertilizer Recommendation Guide (Union Sahayika) is being used as a tool for agricultural development activities/planning at grassroots level which is generated from Upazila Land and Soil Resource Utilization Guide. A number of 121 Union Sahayika were prepared and published in the fiscal year 2020-21.

SRDI has launched Online Fertilizer Recommendation System (OFRS) since 2009. The system aims at quick and easy delivery of fertilizer recommendation service, maintaining soil fertility and minimizing misuse of chemical fertilizer, reducing production cost and increasing crop production. In FY 2020-21, about 81,119 farmers/beneficiaries benefited by using OFRS software.

Soil and Land related Data Processing and Map Preparation program was introduced for usage of GIS in storage, retrieval and visualization of soil and land related data. ArcGIS software was used for spatial data analysis as well as map preparation through georeferencing. AEZ map,

physiography map, soil nutrient deficient map, soil and landform map, flood prone area map and land degradation baseline map were prepared in 2020-21 fiscal year. The digitized maps depicts the updated scenario of nutrient deficiency, flood prone area, physiography as well as AEZ related features throughout the country.

Under the “Decision Support for Mainstreaming and Scaling up of Sustainable Land Management (DS-SLM) Project”, SRDI conducted the baseline study of land degradation processes from the year 1985 to 2000. Sixteen processes of land degradation are delineated in maps in a way that can be updated in future with adding new generated data. Land degradation class or the degree of degradation is estimated in relation to declined productivity, changes in agricultural suitability, in some cases, to social conditions that affect people and declined safe food production. The document depicted that 74.2% land of the country went under land degradation for nutrient depletion, 78.9% area is degraded for organic matter depletion and 56.7% land is degraded for acidification.

SRDI launched Soil Test Based (STB) Fertilizer Recommendation System through Mobile Soil Testing Laboratories (MSTL) since 1996. At present, SRDI runs 10 MSTL for serving the farmers with soil testing facilities in Rabi and Kharif season every year. 10 MSTL provided 5638 fertilizer recommendation cards in 56 upazilas in 2020-21. It was observed that due to application of recommended fertilizer dose yield of different crops and varieties increased up to 13% – 33% over farmer’s practice.

In coastal region, soil salinity in shrimp cultivated area gradually increased from 1990s. This salinization may be due to the effect of saline water flooding for long period, slow permeability, presence of highly saline ground water at shallower depth almost throughout the year and lack of flashing facility after shrimp harvest etc. River water salinity of Noakhali and Bhola district is less than that of Khulna, Bagerhat and Satkhira districts. In Satkhira, river water salinity was found highest in May/June whereas in Noakhali and Barishal it was highest in April/May. River water remains saline during April-June as rainfall is low during this period. During the dry season most of the DTW and STW water remains saline. Generally Barisal experiences lower rainfall during November to March. In Patuakhali, both soil and water salinity starts to increase in January/February, attains its peak in March and starts to decrease in June/July at the onset of monsoon. In Chittagong and Cox’s bazar soil salinity starts to increase in December, attains its peak in March and then gradually decreases at the start of monsoon. Water salinity starts to increase in January, attains its peak in April/May.

Soil Conservation and Watershed Management Centre (SCWMC), Meghla, Bandarban has developed some advanced technologies for slopping hill soil management, among those staggered trenching, half-moon trenching, slash and mulch system of agro-forestry, hedge row technology and Natural Vegetative Strips (NVS) for controlling soil erosion in hill slopes are most significant. In case of saline soil management, innovative technologies generated by Salinity Management and Research Centre (SMRC), Batiaghata, Khulna that proved very effective are top soil carpeting technology for vegetable production on shrimp-gher bund, pitcher irrigation, double layer mulching, maize transplanting & dibbling cultivation under zero tillage, flying bed agriculture for vegetable cultivation, selection of different suitable varieties for saline soils. These technologies can be disseminated to other coastal saline areas.

Technology Transfer through Adaptive Trials program has been initiated to popularize Upazila Nirdeshika based fertilizer recommendation system among the farmers as well as to demonstrate the benefits of balanced fertilizer application to conserve soil health along with sustainable crop production. Altogether 42 Adaptive Trials were set up in the 2020-21. The yield data of Adaptive Trial plots revealed that farmers got 13%-31% higher yield in different crops and varieties in comparison to farmers' practices in different locations.

Soil, plant, water and fertilizer sample analysis program was initiated to evaluate soil fertility status and recommend balanced fertilizer doses for crops based on soil analytical results and crop requirements through static laboratory, to analyze fertilizer samples in order to assist the agricultural system to control adulteration of fertilizers, to update soil physico-chemical databases in SRDI's soil and land utilization guide and to analyze water and plant samples received from different Government and non-Government organizations. During 2020-21 Static Laboratories conducted soil analysis for both physical and chemical parameters, plant and water analysis for chemical parameters and fertilizer samples analysis under different programs. In Static Laboratories (Central and Regional Laboratories) 22,198 soil samples, 23 water samples, 527 plant samples and 4,344 fertilizer samples were analyzed. Central Laboratory conducted research on various aspects of soil and fertilizer management, sludge management, nutrient management and so on. In addition, 5638 soil samples were analyzed by 10 MSTLs.

Training was imparted to the officers and scientists of SRDI, BARI, BRRRI and BINA on Chemical Analyses of Soil and Fertilizers, Identification of Adulterated Fertilizers at Field Level, Procedure of Composite Soil Sample Collection and Techniques of Balanced Fertilizer Applications. Training was given to 1,200 Officers of SRDI/DAE/CDB/NGO's on various aspects of soil management/capacity building & skill development; 12,933 farmers/fertilizer dealers/ SAAO's/Entrepreneurs of Union Information Center on the use of Upazila Nirdeshika/soil sample collection technique/identification of adulterated fertilizer etc.