Success Story

LIVELIHOOD IMPROVEMENT OF RURAL TRIBAL FARMERS THROUGH SOIL HEALTH MANAGEMENT, INPUT SUPPORT SYSTEM AND TRAINING - A SUCCESS STORY

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ABSTRACT
Since the farmers of Sikkim are quite unaware about different innovative modern organic input, techniques of soil health management and innovative technologies they are bound to cultivate agricultural crops in traditional manner. Farmers of Sikkim generally don't know how the soil health can be improved. This study was conducted during the period of 2014-16. After distributing the inputs under Tribal Sub Plan (ICAR-TSP) to tribal farmers in Sikkim it was found that application of recommended dose of all the soil inputs increased nutrient use efficiency upto 10-15%, CEC upto 30-35%, soil organic carbon 2-5% from initial value (0.81%), soil pH 25-35%, and crop productivity upto 20-30% along with increases in grain yields upto 12-15% in major crops of Sikkim. Besides all the macro and micro nutrient content also increased 10-35% after application of such soil inputs. Under this project 250 soil samples were collected from farmers' field of different villages, geo-reference soil samples were collected, processed, analyzed and soil health card prepared and distributed to the farmers by the Hon'ble Union Minister of Agriculture and Farmers Welfare Shri Radha Mohan Singh during his visit at ICAR Sikkim Centre, Gangtok on 17th January, 2016.

INTRODUCTION

Sikkim enjoys a wide range of climate, physiographic, geology and vegetation that influence formation of different kinds of soils. Hills of Sikkim mainly consist of gneissose and half-schistose rocks, producing generally poor and shallow brown soils. The soil is coarse, with large concentrations of iron oxide; ranges from neutral to acidic making it lacking in mineral nutrients. This type of soil tends to support evergreen and deciduous forests. Rock consists of phyllites and schists, which is much younger in age and is highly susceptible to weathering and erosion. This, combined with the state's heavy rainfall, causes extensive soil erosion and the loss of soil nutrients through leaching. It is observed that inceptisols are dominant (42.84%) followed by entisols and mollisols occupying 42.52% and 14.64% respectively. The area under acid soil having pH <5.5 of the state is 683.49 sq. km which is 53.0% of the geographic area. Similarly, percentage area under Zn deficiency (<0.6 mg kg^{-1}) in Sikkim is 15.69% (202.35 sq. km) of the geographic area having highest Zn deficiency in South Sikkim district (82.07 sq. km, 19.1% of TGAD) followed by East (56.84 sq. km, 13.3% of TGAD), West (48.91 sq. km, 15.7 of TGAD), and North (14.53 sq km, 11.8% of TGAD). Percentage area under Mn deficiency (<3.5 mg kg^{-1}) in Sikkim is 10.16% (131.02 sq. km) of the geographic area having highest Mn deficiency in South Sikkim (48.72 sq. km, 11.3 of TGAD) followed by East (34.52 sq. km, 8.1% of TGAD), North (28.82 sq. km, 23.13% of TGAD) and West (18.96 sq. km, 6.1% of TGAD) (*TGAD= Total geographic area of the district). The important biofertilizers like Rhizobium for leguminous crops, Azotobacter/Azospirillum for non-legumes, blue green algae (BGA) and Azolla for irrigated rice and PSB for solubilizing the native P have large potential for supplementing chemical fertilizers along with organic manure for intensive farming. Besides, green manuring with dhaincha (S*esbania aculeata*), sunnhemp (C*rotalaria juncea*), rice bean (*Vigna umbellata*) have potential to increase fertility. The soils of Sikkim are highly susceptible to erosion which causes severe nutrient deficiency mainly nitrogen which washes out from soil profile through leaching loss.

INSTITUTIONAL INVOLVEMENT

Considering these facts in mind following objectives were proposed to take on the project under Tribal Sub

Plan (TSP) to cope with soil fertility and livelihood improvement in tribal farmers. They are: to supply inputs like bio fertilizer, vermicompost, soil conditioners, green manuring etc. to the tribal farmers along with technological support; analysis of soil sample in tribal farmers field and field testing of these innovative organic inputs in farmers field; and capacity building programme and training on soil health management among tribal farmers. Different innovative organic products like biofertilizers, vermicompost, soil conditioners, green manuring, mixed compost, soluble organic granular sources were distributed to innovative and progressive farmers. Analysis of soil sample in farmers field were done and based on that testing of the innovative organic products on farmers' field at village level along with the technological support will be organized. Different training programs were organized for the farmers so that they can know how to manage soil health to increase productivity as well as soil fertility.

SPECIAL INVOLVEMENT (SOIL HEALTH CARD)

Considering the celebration for International Year of Soils, 2015 and issuing of Soil Health Card ICAR Sikkim Centre, Tadong along with KVK, Ranipool (East) has collected 250 soil samples collection from farmers field of different villages namely; Tempyem, Sajong, Sajong-Rumtek, Rumtek, Lossing, Samlik and Namin villages (1150-1450m above MSL) of East Sikkim District. Geo-reference soil samples were collected by Mr. Shoan Kumar Das, Scientist (Agril. Chemistry/Soil Science). During the collection, he monitored the field of respective farmers and took feedback from them. Further, awareness on "Soil Health Card" was also imparted to the farmers which will provide crop wise recommendations of organic nutrient requirement for the individual field to enhance the crop productivity. The soil health card gave information both on macro and micro nutrients. Sampling had been made from an area of 10 ha grid under rainfed condition. GPS and other detailed information have also been collected from each and every farmer belonging to that grid area. Based on the analysis of soil sample, Soil Health Card were distributed to the 250 nos. of farmers on the occasion of World Soil Day on December 5, 2015. Shri P. D. Rai, Hon'ble MP (Lok Sabha-Sikkim) has been briefed about the exercise of soil sample collection and issue of Soil Health Card. He evinced great interest in this important activity keeping in view Sikkim becoming Organic Farming State by 2015 end wherein soil health will be of paramount importance. Soil health card was distributed by the Hon'ble Union Minister of Agriculture and Farmers Welfare Shri Radha Mohan Singh during his visit at ICAR Sikkim Centre, Gangtok on 17th January, 2016.

SUCCESS RESULTS OF TSP

Under this project different training programme through input support system has been organized at Singhik, North Sikkim on 28th Oct. 2014; Chungthang, North Sikkim on 30th Oct.2014; Dzumsa Lachen, North Sikkim on 30th Oct.2014; Naga, North Sikkim on 1st Nov. 2014; lower Sadam, South Sikkim on 17th Dec. 2014; Ravitar, West Sikkim on 18th Dec. 2014; Perbing, West Sikkim on 19th Dec. 2014; ICAR Sikkim Centre on 1st July and 13th Oct., 2015; Tempyem, East Sikkim on 15th Dec., 2015; Hee-Gyathang, North Sikkim during 3rd to 5th Feb., 2016; Ringhim, North SIkkim on 21st April, 2016; Salghari GPU and Poklok GPU, South Sikkim on May 10 and 11, 2016. Various necessary inputs like organic biofertilizers (mixture of N fixer, P solubilizer and K mobilizer) 12,000 kg, organic plant nutrient foliar spray 300 pieces (100 ml), dolomite (1000 kg), rock phosphate 200 kg, neem cake 1000 kg, sea weed extract granules 700 kg and vermibeds 15 nos. has been distributed among the tribal farmers of different district of Sikkim. Farmers were very much interested and expressed their thanks to ICAR for distribution of such different types of inputs. Under this project more than 600 tribal farmers were benefited. Farmers got good results by using the soil inputs and they told that they are getting more production and productivity by using these soil inputs. Before and after distributing of the soil input the respective soil scientist Shaon Kumar Das visited the farmer's field, collected soil sample and analyzed. It was found that application of recommended dose of all the soil inputs increased nutrient use efficiency upto 10-15%, CEC upto 30-35%, soil organic carbon 2-5% from initial value (0.81%), soil pH 25-35%, and crop productivity upto 20-30% along with increases in grain yields upto 12-15% in major crops of Sikkim. Besides all the macro and micro nutrient content also increased 10-35% after application of such soil inputs.

OUTCOME ASPECTS

From the above study, it can be concluded that by implementing such type of farmers friendly project (TSP), soil health problems in Sikkim (which is an organic state) can be managed properly.

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Fig. 1. Delivering lecture during training programme

Fig. 2. Input distribution after training programme

Fig. 3. Hon,ble Agriculture Minister distributed inputs to tribal farmers

Fig. 4. Input distribution after training programme

Fig. 5. Hon,ble Agriculture Minister distributed soil health cards

Fig. 6. Input distribution after training programme

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