THEME 2

Enhancing Soil Organic Carbon through Tank Silt Application

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INTRODUCTION

Climate Change and Soil Health

Climate change poses threat to monsoon dependent rainfed farming worldwide. Increased dry spell often pushes them to re-sow failed crops. Indiscriminate use of chemical fertilizers changed the soil nutrient composition and physical properties (hardening of top soil). It prevents the soil from absorbing rain water, and in-turn surface runoff during rainfall erodes the top soil. The reduction of soil organic matter and moisture holding capacity also increases the risk of rainfed farming and increases the cost of cultivation, leading farmers to abstain from farming, lose employment and face food and nutritional insecurity.

Study Area

This farmers participatory research was conducted in T.Kallupatti (77.89^0 E longitude and 9.75^0 N latitude) block of Madurai district, Tamil Nadu in India. People locally classify the soil type as "*pottal*" (clay with less moisture holding capacity and fertility) and "*karisal*" (black cotton soil with high moisture holding capacity).

Fig. 1: Tank Silt being Applied in Rainfed Land

OBJECTIVES

Tank Silt Application

Tank silt is a fine soil brought from surface runoff during rainfall from catchment area along with crop debris and is deposited as sediment in the tank water spread area and decomposed over a period time. This silt is considered to be rich in organic matter. The poor physical, chemical and biological property of the soil heightens the ill effects of climate change, which significantly affects the rainfed cropping. The study focused on application of tank silt along with goat penning to change the physical and nutritional characteristics of soil. Upto 2-3 feet sediment (tank silt) was excavated and transported and spread in agricultural field and incorporated during ploughing. In each acre of rainfed land 50 cubic metres tank silt was applied for 104 farmers (including 73 acres of *pottal* land and 31 acres of *karisal* land).

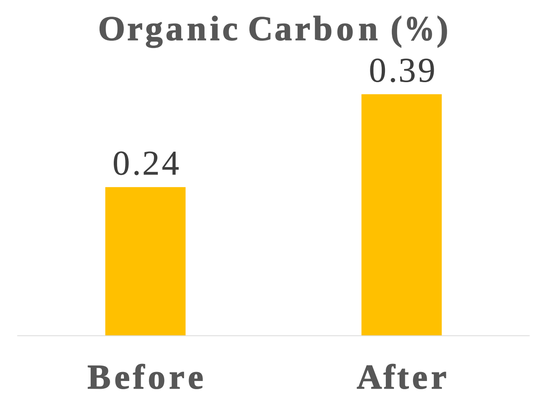
MAIN RESULTS

Effect on Organic Carbon

Tank silt has significant amount of organic carbon (0.89) that changed the organic carbon content of soil ranging from 0.03 to 0.40. It also increased its moisture holding capacity.

Tab. 1 (a+b): Effect of Silt Application on Soil Organic Carbon

Organic Carbon (%)		
Before	**After**	**Change**
0.29	0.69	0.40
0.34	0.37	0.03
0.27	0.36	0.09
0.2	0.31	0.11
0.13	0.29	0.16
0.19	0.31	0.12



Effect on Electrical Conductivity (EC)

Application of tank silt reduced the EC from 0.02 to 1.21 dSm^{-1}, which was caused by use of saline ground water and excessive use of inorganic fertilizer.

Effect on Crop Yield

Yields of crops such as Barnyard millet, Maize, Paddy, Pearl-millet, Cotton and Chilly cultivated by the participant farmers in the study area with (treatment) and without tank silt (control) application were measured and compared with their average normal yields.

Fig 2: Increased crop yield

CONCLUSION

Tank silt is a locally available and low-cost substitute for chemical fertilizer. It has demonstrated its efficacy in augmenting adaptation capacity of rainfed farms to climate change in the study area. It has proven for multiple benefits on climate resilient farming that can be promoted in large scale.

Fig. 3: Tank Silt

Tab. 2: Effects of tank silt application on crop yield

Yield (Kg. per acre)				Increase of yield (%) compared with	
Crop	**Control**	**Normal**	**Treatment**	**Normal**	**Control**
Barnyard millet	100	700	1400	100.00	1300.00
Maize	909	1400	1067	-23.78	17.38
Paddy	2448	2880	3500	21.52	42.97
Pearl millet	328	600	417	-30.50	27.13
Cotton	70	350	222	-36.57	217.14
Chilly	100	650	625	-3.84	525.00