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Knowledge level of soil management practices and their adoption by farmers of Odisha

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ABSTRACT

Bringing Green Revolution in Eastern India (BGREI) was launched to turn eastern region of the country into a food surplus zone. The state of Odisha has been included under the scheme due to its potential to increase productivity. This however is possible only if steps are taken to manage acidic soil in the state and improve soil health and fertility. The present study was carried out in two villages of Mayurbhanj district of Odisha to find out the extent of adoption of acidic soil management practices by the farmers and constraints faced by them. Aggregate adoption scores indicated medium level of adoption. Use of compost (42.22%), application of soil amendment (38.88%) and soil testing and application of micronutrients (37.78%) were adopted by maximum number of farmers. On the other hand use of super phosphate in compost pit (80%), application of sulphur (67.78%) and use of bio-fertilizers (66.66%) were rejected by farmers. Major constraints in adoption include difficulty in understanding soil test recommendations, lack of awareness and non-availability of inputs.

Keywords: Adoption; acidic soil management; soil testing; INM

INTRODUCTION

High yielding varieties (HYVs) were introduced in India in the early sixties for increasing the food grain production to meet the growing demand for food. The HYVs demand more inputs like groundwater, chemicals, fertilizers and pesticides which leads to monoculture, intensive cropping systems, excessive and inappropriate use of agrochemicals resulting in pollution of the ecosystem. Degradation of natural resources has a direct impact on agricultural productivity as it undermines the basis for future agricultural production through erosion of soil and depletion of soil nutrients. However estimates of the magnitude and productivity impacts of land degradation are debatable (Anon 2008a). Food production in the country has reached a plateau in the last two decades in spite of increase in fertilizer consumption during recent times. Lack of information on part of the farmer about soil health and

non-adoption of soil health management practices is believed to be an important constraint in increasing agricultural productivity in the country.

Bringing Green Revolution in Eastern India (BGREI) aims at turning eastern region of the country into food surplus region to meet the future food requirements. Five eastern states viz Odisha, Assam, West Bengal, Chhattisgarh and Bihar have been identified for implementation of the scheme due to potential for increase in production and productivity. This potential can however be realized only by increasing soil health awareness and adoption of recommended soil management practices by the farmers (www.bgrei-rkvy.nic.in).

The state of Odisha has different soil types ranging from fertile alluvial deltaic soils in the coastal plains, mixed red and black soils in central table land, red and yellow soils with low fertility in the northern plateau to red, black and brown forest soils in eastern Ghat region. The soil types differ widely from highly acidic to slightly alkaline and from light sandy to stiff clays. It is mostly acidic with the degree of acidity varying widely. Out of the total cultivated area of 61.50 lakh ha about 40.17 lakh ha is acidic soil. Further about 4 lakh ha is exposed to saline inundation, 3.54 lakh ha to flooding and 0.75 lakh ha to water-logging particularly in the deltaic areas (Anon 2008b). Hence soil health enhancement holds the key to raise farm productivity and restoration of soil health and thus fertility is one of the primary needs of Odisha's agriculture. The government has taken up several measures like issuing soil health cards in a campaign mode, setting up and encouraging the use of soil testing facilities, promoting INM and providing soil amendments such as lime, basic slag, gypsum, paper mill sludge, etc at subsidized rates to achieve these objectives.

It has also been observed that off-farm income, location, perceived profitability and complexity influence adoption of soil management practices. In general farmers tend to adopt simple and low cost practices (Shashekala et al 2004). Age, education, land holding, socio-economic status, extension contact, innovativeness, availability of bio-fertilizers and soil testing facility have a significant positive correlation with adoption of soil management practices (Asthana and Kumar 2008, Talape et al 2011).

This study was taken up to find out the extent of adoption of soil management practices being promoted by the Government of Odisha and constraints faced by the farmers in adoption of these practices.

METHODOLOGY

The study was carried out in Mayurbhanj district of Odisha. Mayurbhanj

district was selected purposively as it falls in highly acidic soil belt and several soil management practices are being actively promoted by the state government here. Application of paper mill sludge is being promoted in Mayurbahnj under a district specific plan. The district also has several bio-fertilizer and vermicompost units and a soil testing laboratory. For final data collection 30 per cent farmers from two villages were selected randomly using random number table. The final sample included marginal, small and large farmers and a pre-tested interview schedule was used for data collection. Analytical and ex-post facto research design was used for the study.

RESULTS and DISCUSSION

Knowledge of farmers about soil health management: A comparison of the knowledge level of the farmers on all the three aspects of soil health management indicates that maximum number had medium level of knowledge (Table 1). Maximum farmers (76.66%) had the medium knowledge of acidic soil management, followed by INM (62.22%) and soil testing technology (57.78%).

Adoption of soil management practices: Eleven soil management practices were selected for the present study. These 11 practices were being specifically promoted by the Government of Odisha in the acidic soil belt of the state. These practices were further divided into three sub-categories viz soil testing, INM and acidic soil management. Adoption of all the 11 practices was studied separately as well as cumulatively. Adoption by the farmers was divided into three categories viz full (continued use of the practice), partial (initial use followed by discontinuance) and non-adoption (not using the practice at all). Overall adoption of soil management practices was expressed in terms of aggregate adoption scores.

Among all the soil management practices being promoted in the study area full adoption of compost was found to be the highest among farmers (42.22%) followed by application of soil amendment (38.88%). Highest adoption of compost was due to easy availability of composting material to the farmers and awareness about harmful effects of chemical fertilizers. Awareness about problems associated with acidic soil and information on remedial measures was the reason behind high adoption of soil amendments (Table 2).

Soil sample collection and soil testing practices were partially adopted by 37.78 per cent farmers. Their discontinuance was mainly due to difficulty in understanding soil test reports and long delay in getting the test reports from the soil testing laboratories. Also yield gain due to soil testing was indirect (lack of observability) and fully dependent upon following the recommendations which led to discontinuance after initial adoption.

Table 1. Knowledge level of farmers on soil health management

Aspect of SHM	Knowledge level (%)		
	High	Medium	Low
Soil testing technology	21.11	57.78	21.11
INM	20.00	62.22	17.78
Acidic soil management	13.34	76.66	10.00

Table 2. Adoption of soil management practices by the farmers

Recommended practice	Extent of adoption (%)		
	Full adoption	Partial adoption	Non-adoption
Soil sample collection	36.67	37.78	25.55
Soil testing	37.78	37.78	24.44
Use of bio-fertilizer	23.34	10.00	66.66
Use of compost	42.22	23.33	34.45
Application of neem coated urea	34.45	05.55	60.00
Use of super phosphate in compost pit	13.34	06.66	80.00
Application of NPK	33.33	32.22	34.45
Application of sulphur	30.00	02.22	67.78
Application of micronutrients	37.78	08.89	53.33
Application of soil amendment	38.88	15.56	45.56
Application of paper mill sludge	36.67	13.33	50.00

Out of the eleven soil management practices non-adoption was found to be highest for use of phosphorous in compost pits (80%) followed by application of bio-fertilizers (66.66%). Although a large number of farmers in the study area had compost pits in their field they were lacking in scientific knowledge on composting (use of phosphorous in compost pit). As a result this practice was not adopted by a large number of farmers. Bio-fertilizers need greater care and caution while storing and usage to retain their efficacy. Hence their adoption was also found to be very low.

Constraints in adoption of soil management practices: The present study was carried out to find out the extent of adoption of soil management practices in the acidic soil belt of Odisha state in India.

It was found that the overall adoption of the recommended practices was not high. Farmers in the region faced several constraints that limited the extent of adoption of these practices. Adoption of soil testing practices was limited by difficulty in understanding and following the soil test based recommendations (23.33%). This could be due to the fact that soil testing technology is a complex innovation. Farmers were also hesitant about adopting these practices due to delay in getting test results. Hence high complexity and lack of observability slowed down the adoption of these practices (Table 3).

In case of INM lack of information on recommended dosage (24.44%) acted as a major constraint. In addition lack of awareness about bio-fertilizers and micronutrients (20%) and non-availability of bio-fertilizers (16.66%) also hindered adoption. Adoption of acidic soil management practices was limited by two

Table 3. Constraints in adoption of soil management practices by the farmers

Practice	Constraint	Farmers (%)
Soil testing technology	Difficulty in understanding soil test-based recommendations	23.33
	Difficulty in following test-based recommendations	23.33
	No certainty in yield gain	18.88
	Lengthy procedure	13.33
	Non-availability of test report on time	13.33
	Lack of information about STT	11.12
INM	Lack of information about recommended dosage	24.44
	Lack of awareness about bio-fertilizers and micronutrients	20.00
	Non-availability of bio-fertilizers	16.66
Acid soil management	Non-availability of soil amendment	37.77
	Lack of awareness about problems related to acidic soil	17.77

important constraints. Non-availability of soil amendment was reported as a constraint by 37.77 per cent farmers. In addition 17.77 per cent did not adopt the recommended practices due to lack of information on its proper application.

The present study confirms earlier studies (Dube and Sawankar 1992, Poswal et al 2006) which indicate medium to low adoption of agricultural innovations in general and soil management practices in particular (Saxena and Singh 2000). Several constraints in adoption of soil management were observed during the present study. These include difficulty in understanding the recommendations, uncertainty in yield gain and non-availability of inputs. Similar constraints have also been reported by others (Oberoi and Moorti 1980, Ajore 1986, Ramachandran and Sripal 1990, Christain et al 2005, Pagaria 2011, Singh and Varshney 2010).

CONCLUSION

During the study lack of information about the recommended practices and difficulty in understanding the recommendations emerged as two important constraints in adoption of soil management practices. This indicates that extension agencies have to make more intensive efforts to reach the farmers in the study area. There is also need to simplify soil testing procedure and cut short the delays. These measures should be accompanied by reporting the test results in simple and comprehensible language and periodic guidance by the extension field staff.

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