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FARMERS ATTITUDES TOWARDS ADAPTING CLIMATE CHANGE THROUGH SOIL TESTING

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ABSTRACT

The Pacific Islands including Fiji are the most vulnerable to climate change due to its geographical remoteness and size. Therefore, sustainable crop production and land management practices become very important. Soil testing is a comprehensive soil fertility evaluation tool, which helps the farmers to apply chemical fertilizers judiciously. This enables farmers to know how much nutrients are already available in the soil and how much to be provided additionally for a particular crop. Therefore, a study was conducted in the Nalaoto and Wailotua districts of Tailevu Province, Fiji to find out the knowledge of farmers toward soil testing practice and attitude of farmers towards soil testing practices. The research instrument was a structural questionnaire with close ended questions which confirmed its validity and reliability. The target population included all farmers. There was a significant difference between the personal, farming and educational characteristics of adopters and non-adopters of soil testing. Study concluded that farmers, however, have knowledge of soil testing and its importance towards sustainable crop production and land management practices, but the encouragement and attentiveness is still needed to change their attitude towards soil testing especially of those who were disagreed with most of the attitude statements. More importantly need is to inspire farmers for soil testing practices by organizing training programmes on importance of soil testing, soil fertility management for sustainable crop production, soil test and soil health campaigns with special attention to soil testing as a tool.

KEYWORDS: Farmers Attitudes, Knowledge, Attitude, Soil Fertility, Soil Testing

INTRODUCTION

Climate change poses a direct and growing threat to the livelihoods of people in agriculture. Poor rural households, whose livelihoods depend predominantly on agriculture and natural resources, may bear a disproportionate burden of adverse impacts of climate change and thus should be the focus of adaptation interventions. The Pacific Islands including Fiji are the most vulnerable to climate change due to its geographical remoteness and size. Therefore, sustainable crop production and land management practices become very important. Judicious application of chemical fertilizers by the farmers in crops is very much essential to achieve maximum production and to earn maximum profit.

Balance use of fertilizers is one of the important indicators of better productivity, sustainable land management and better soil health. In order to attain higher productivity and profitability, farmers need to realize that fertility levels must be measured, so as the recommendations can be used to manage long-term soil fertility.

Soil testing is a comprehensive soil fertility evaluation programme which helps the farmer's injudicious application of chemical fertilizers to the crops. The soil testing of a particular field gives reliable information about the

deficiency of major nutrient in the soil as well as hazards such as soil acidity, alkalinity and salinity etc. After testing the soil, farmers can know the exact amount of nutrients to be applied for a particular crop. The farmers will be able to know how much nutrients are already available in the soil and how much will have to be provided additionally for a particular crop. Therefore, soil testing will definitely be advantageous to the farmers in achieving maximum production and in earning max profit. So it is essential to create maximum awareness among farmers about judicious use of chemical fertilizers. Keeping in view the importance of soil testing towards optimum production of crop and maximum net profit of farmers, this study was carried out in the Nalaoto and Wailotua districts of Tailevu province, Fijito find out the knowledge of farmers toward soil testing practice and attitude of farmers towards soil testing.

REVIEW OF LITERATURE

Parvizi (2005) described soil management as an optimal use of farm soil resources for improving production management and achieving sustainable goals. Cramb (2004) suggests that soil management is the best method to prevent destruction of soil and to farm crops sustainably. Lal (2003) indicated that soil management can play important roles in improving utilization increasing self-sufficiency of nutritious crop, decreasing poverty levels and providing food and sustainable agriculture.

Soil Testing (ST) is known as a precise management method for determining and assessing soil fertility that enables farmers to assess the impact of management methods and identify what changes are needed each year (Malakoti and Tehrani, 1999).

Srivastava and Pandey (1999) believed that most farmers continuously use a great deal of chemical fertilizers for increasing production without awareness of their farm fertility condition. ST is a general evaluation program of soil fertility that helps farmers to use chemical fertilizers wisely. In fact, this method is a mechanism that facilitated economical fertilizer assessment. Until now, the necessary amount of nutrition per surface for each crop was determined according to fertilizer suggestion which was approximately the same for all areas regardless of different soil and weather conditions. Now a days experts emphasize that fertilizer suggestion (especially nitrogen and phosphorus fertilizers) including amount, source, kind and time of using fertilizer must be done according to soil analysis of each area (Mylavarapu, 2003; Oldham, 2007). Thus, costs of extra use of fertilizer in fertile farms are decreased and the lack of nutrients in less fertile soil is recompensed (Goshchi, 2004). Yadav *et al.* (2006) stated that ST has exposed some information about the accurate amount of nutrients of special kinds of plants and also other information such as acid and saline-alkali soil. Neufeld and Davison (2000) knew ST as the only necessary and available tool for determining the amount of soil nutrients.

MATERIALS AND METHODS

The study was conducted in Nalaoto and Wailotua districts, Tailevu, Fiji. Out of seven villages of these districts, 115 farmers were randomly selected for the study. The data were collected by individual interview methods using well-structured questionnaire for the purpose. Each farmer was asked to complete a closed ended questionnaire. 95 farmers returned the complete questionnaire which was analyzed using descriptive statistics. The analysis involved computations of mean and frequency. The attitude of the farmers towards soil was measured on the basis of their agree, disagree and undecided responses to a list of questions that seek knowledge/attitude of farmers towards soil testing. Other variables in the study include socio-economic characteristics of the farmers such as age, education level and farming experience.

RESULTS AND DISCUSSIONS

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads:

Demographic Characteristics

The distribution of the respondents according to some socio-economic characteristics is given in Table 1. The data indicated that the mean age of the farmers lies between the range 40-50 years old which suggest the youthfulness of the farmers keen in changes and education. The youth age is the positive indicator for sustainable agriculture based on the soil fertility evaluation. It is also evident from the data that more than 70 per cent respondents attained primary or secondary education as the adequate education enhances farmer's knowledge level and positive outlook towards soil testing which is an essential component of soil fertility and sustainable agriculture.

Table 1: Distribution of Farmers by their Demographic Characteristics

Variables	Categories	Frequency	Percentage
Age (years)	<30	11	11.6
	30-40	19	20.0
	40-50	50	52.6
	50-60	13	13.7
	>60	2	2.1
Education level	No education	10	10.5
	Primary	47	49.5
	Secondary	21	22.1
	Certificate	13	13.7
	Diploma	4	4.2
Farming experience (years)	<5	9	9.5
	5-10yrs	39	41.1
	10-20yrs	32	33.7
	>20yrs	15	15.8

Table 2: Response of Farmers about Soil Testing Practices

S. No.	Statements	Response		
		Agree	Disagreed	Undecided
	Soil testing is necessary and crop yields could be improved by monitoring the soil nutrient status by test	71	16	8

Response to Soil Testing

Table 2 dealt with the response of the farmers about soil testing practices. Majority of the farmers 71 (74.73%) agreed that soil testing is necessary and crop yields could be improved by monitoring the soil nutrient status by test. They had knowledge about soil testing as their attitude was favourable; 8 (8.4 per cent) farmers did not express any response, however, 16 (16.84 per cent) respondents had shown unfavorable attitude as they had no knowledge about soil testing.

Farmers' Attitudes towards Soil Testing

The ability of performing one special technology depends on farmers attitudes toward the reality of technology (Wayessa, 2003). Farmers were asked to indicate their attitudes toward ST for 7 statements. The 7 statements were measured on a Likert-type scale that ranged in seven positive statements from, agree = 1, disagree = 2, and undecided = 3.

Table 3: Distribution of Respondents According to their Attitude towards Soil Testing

S. No.	Attitude Statements	Resposnse					
		Agree		Disagreed		Undecided	
		Frequency	%	Frequency	%	Frequency	%
1.	Too much use of fertilizer cause pollution	74	78	5	5	16	17
2.	Soil erosion is important problem	70	74	7	7	18	19
3.	I want to learn about soil sampling	68	72	5	5	22	23
4.	Prefer soil testing for fertilizer application	65	68	8	8	22	23
5.	If one of the village farmer does soil testing will use his results	16	17	60	63	19	20
6.	Soil testing as it is very costly	15	16	48	51	32	34
7.	Encourage other farmers to use soil testing	67	71	10	11	18	19

Findings indicate that adopter farmers had more favorable attitudes toward soil testing more extension contacts about Soil testing and more use of information resources about Soil testing than non-adopter farmers.74 (78%) farmers agreed that too much use of fertilizers cause pollution and about 70 (74%) farmers also agree that soil testing also helps to know the ill effects of erosion. About 62 (72%) were eager to learn soil testing and 65(68%) preferred to test soil before they apply fertilize crops.60 (63%) farmers disagreed with the statement that if one of the village farmer does soil testing his resultscan be used to fertilize their field also.67 (71%) farmers agreed that they will encourage other farmers of the village who are not testing their soil. This finding is consistent with the results of various published literature (King, 1999; Yadav *et al.*, 2006; Cramb *et al.*, 2006; Mylavarapu, 2003; Oldham, 2007; King and Rollins, 1999; Tucker and Napier, 2002).

Table 4: Distribution of Respondents According to their Source of Knowledge about Soil Testing

S. No.	Statements	Frequency	%
1.	Visits of extension agent and experts	47	49
2.	Radio	16	17
3.	Television	8	8
4.	Mobile/Internet	4	4
5.	Agril. Ext. Literature	12	13
6.	Fellow farmers	5	5
7.	No knowledge	3	3
	Total	**95**	**100**

The data in Table 4 indicated that majority of respondents (49 %) were using the knowledge gained from visits of extension agent and experts. Seventeen per cent respondents depended upon radio and thirteen per cent on extension literature on agriculture extension for knowledge about soil testing practices. Eight per cent respondents gained knowledge through television while five per cent respondents collected knowledge from fellow farmers. Only four per cent respondent's collected knowledge from mobile/internet, three per cent farmers had no knowledge of soil testing practice.

CONCLUSIONS

On the basis of above findings, it may be concluded that farmers, however, have knowledge of soil testing and its importance towards sustainable crop production and land management practices, but the encouragement and attentiveness is still needed to change their attitude towards soil testing especially of those who were disagreed with most of the attitude

statements. The respondents with positive attitude realized the fact that soil testing may be the crucial factor for rise in their annual net income through judicious use of plant nutrients and climate change adaptation. More importantly need is to inspire farmers for soil testing practices by organizing training programmes on importance of soil testing, soil fertility management for sustainable crop production, soil test and soil health campaigns with special attention to soil testing as a tool. Imbalanced and indiscriminate use of plant nutrients may be discouraged by soil test only which is the vital method towards sustainable crop production and land management.

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