



An Analytical Study on the Awareness of the Usage of Fertilizers among Marginal Farmers in Karnataka with Special Reference to Hassan District

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Abstract: The current research paper has made an effort to know awareness of the usage of fertilizer and soil tests among marginal farmers in Karnataka with reference to Hassan district. To investigate the proposed objectives, primary data has been collected from the marginal farmers of the Hassan District. Simple statistical tools were used to analyse the primary data and used the Chi-Square test to test the research hypothesis. Secondary data is also used wherever needed to give more strength to the analysis of the research problem. The study shown that marginal farmers have the lack of information about soil tests and the usage of recommended dosage of fertilizer.

Index terms – Marginal Farmers, Awareness, Fertilizer, Soil Test, Agriculture.

1. INTRODUCTION

Table 1: Number of Operational Holdings in Karnataka

Land Size / Class	1995-96	2000-01	2005-06	2010-11	2015-16
	(in '000)				
Marginal (Below 1 ha.)	2610 (41.95)	3252 (45.94)	3655 (48.21)	3849 (49.14)	4767 (54.91)
Small (1 to 2 ha.)	1707 (27.44)	1909 (26.97)	2014 (26.57)	2138 (27.29)	2214 (25.50)
Semi Medium (2 to 4 ha.)	1204 (19.35)	1259 (17.78)	1278 (16.86)	1267 (16.18)	1193 (13.74)
Medium (4 to 10 ha.)	594 (9.55)	569 (8.04)	555 (7.32)	511 (6.52)	451 (5.20)
Large (Above 10 ha.)	106 (1.70)	90 (1.27)	79 (1.04)	68 (0.87)	56 (0.65)

Source: Karnataka Economic Survey-2021-22, (Numbers in the brackets are in percentage)

But are those who believe in that farming earning enough to lead a dignified life? that is the question. According to the NITI Aayog, 61.5 percent of the total working population in 2019-20 is in agriculture. In that too, the participation rate of women is 75.7 percent and the participation rate of men is 55.4 percent. Even though they worked in the agricultural sector to such an extent, India has not developed in the agriculture sector up to the mark and the productivity is below the standard in many cases. This is high in the case of marginal farmers in India and Karnataka as well.

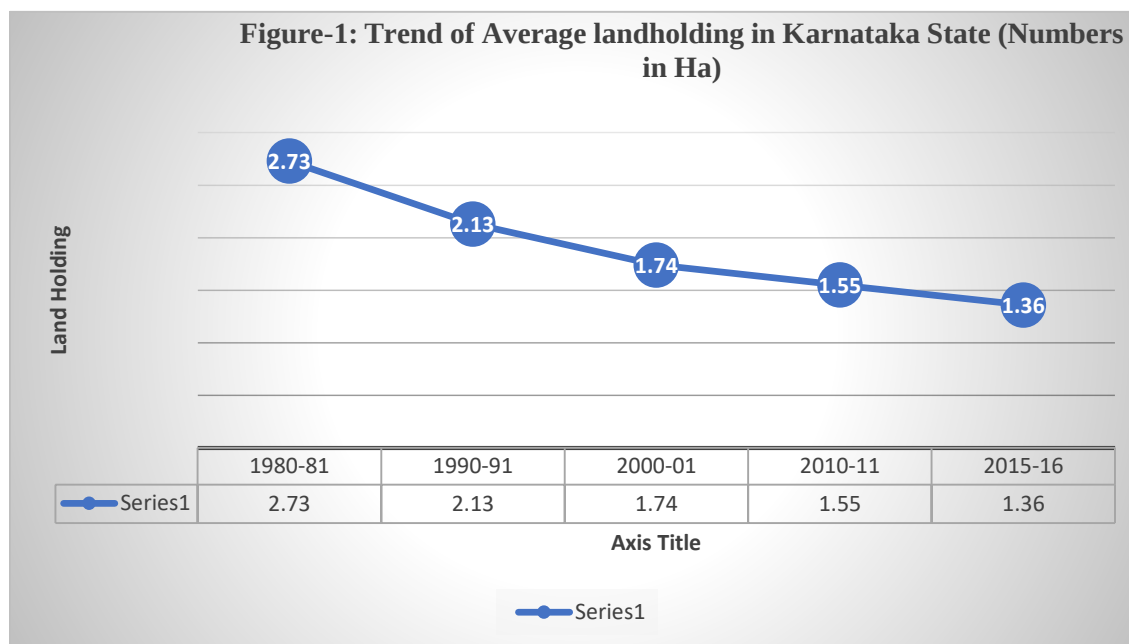
The structure of landholding is one of the causes of the low productivity in agriculture. Classification of farmers according to the standard operational holding of land in Karnataka and the number of holdings is shown in Table 1.

As observed in table 1, since 1956, the number of marginal farmers has been increasing continuously. In 1956, the total number of marginal farmers was 2610 thousand which accounts for 41.95 percent of total operational holdings. This number has increased to 4767 thousand till the end of the 2015-16 agricultural survey and accounts for 54.91 percent of the total operational land holdings in Karnataka. Except for marginal farmers operational land holding all the other categories of land holding have been decreasing continuously. At the same time, the average land holding of Karnataka State has witnessed a negative slope for many years. In 1980-81, the average landholding is 2.73 hecter which decreased to 1.36 hecter in 2015-16. This has been shown in figure 1. These fact and figures show the importance of marginal farmers in the development of agriculture sector and its role in providing employment opportunities to the Karnataka people

Agricultural productivity depends on inputs used to grow the particular crop. Agricultural inputs are defined as products permitted for use in farming. These include feedstuffs, fertilizers and permitted plant protection products as well as cleaning agents and additives

used in food production. The inputs have the significant influence on agricultural production. The timely available of inputs leads to increase the output from agriculture sector in the economy. Broadly agricultural inputs can be classified into two categories such as Durable Inputs and Non-Durable Inputs. Durable inputs include tractors, motors and pump sets, major farm machinery items like harvesters, threshers, winnowers, which are probably purchased once in the life time by a farmer. In non-durable inputs include such as fertilizers, pesticides, seeds and the like, which are required for farming, season after season. When it comes to durable inputs, marginal farmers not able to hold them for their personal use. Most of the farmers will use their service on rental basis. On the other hand, non-durable inputs are not available for rental basis. They have the nature of consumables and reuse of the such inputs is not possible.

There is a significant correlation between use of yielding improving inputs like fertilisers and foodgrains production (K.B, Kannan, & B.T, 2015). Inherently soil has the power of feeding the necessary nutrition to grow crops. However, soil inherent fertility mere not sufficient to produce agricultural crops. It requires many artificial nutrients to maintain the expected level of plants in agriculture. For this purpose farmers will use the required fertilisers to maintain sufficient fertility in their soil. This kind of inputs will influence more on agricultural productivity. Necessity of using these inputs does not depend on the size of landholding of farmers. Either a small farmer or a large farmer, such inputs should be used during the growth stage of the crop to increase soil fertility and to get good productivity. But



not all the farmers have the same purchasing power. Large scale farmers follow scientific methods while selecting the fertilizers required by their crops. They decide the choice of fertilizers required for their crops by means of soil testing, guidance of skilled agronomists etc. But this is something small farmers not able to follow due to financial constraints. In many cases, small farmers do not bother to know the essence of their soil fertility. They do not have the information on how to test it in a particular way. Because of that, in many cases, they use more fertilizers than required and the crops are got damaged. This not only affects the crops but also negatively affects their financial situation. Yet in some cases, without information about the use of proper amount of fertilizers, soil fertility decreases and agricultural productivity decreases. Thereby having a side effect on their source of income for the year. Thus, small farmers reach a state where they are unable to develop by farming alone due to the lack of information on the fertility of their land and the lack of proper knowledge about the amount of fertilizer that should be used to increase it. In this background, in the present study an attempt has been made to know the level of awareness among smallholder farmers about the use of fertilizers in Karnataka with reference to Hassan district. The current study has the following objectives.

2. OBJECTIVES

1. To know the awareness of marginal farmers regarding the usage of fertilizers in the study area.
2. To analyse the marginal farmers' constraints in adopting the recommended dosage of fertilizer in the study area.
3. To analyse the Challenges faced by the marginal farmers in the adoption of recommended dosage of fertilizer in the study area.

3. HYPOTHESIS

Null Hypothesis (H_0): - There is no association between the level of education and awareness of farmers in the usage of required fertilizers in the study area.

Alternative Hypothesis (H_1): - There is an association between the level of education and awareness of farmers in the usage of required fertilizers in the study area.

4. METHODOLOGY

The current research paper has adopted the analytical research method to analyse the proposed research objectives.

- 4.1. **Study area:** The study covers Karnataka State with special reference to Hassan district, which has been recognized as one of the dominant agricultural districts in the state.

- 4.2. **Population and sample:** the population of the current research work is the group of Marginal farmers of the Karnataka state who owned below 1 hectare (2.5 Acres) of agricultural land. To Marginal farmers who residing in the Hassan district of Karnataka state has considered as the sample (respondents) of the current research work.
- 4.3. **Sample Size:** the sample size of the current research paper is 120.
- 4.4. **Sampling:** Convenient sampling method has been followed to collect the primary data from the study area.
- 4.5. **Data:** the current research paper is based on both primary and secondary data.
 - 4.5.1. **Primary Data:** Primary data has been collected from the marginal farmers in the study area with the help of a structured questionnaire.
 - 4.5.2. **Secondary data:** Secondary data has been collected from various authenticated sources such as the Indian Economic Survey, Karnataka Economic Survey, Ministry of Commerce and trade annual reports, Agricultural survey reports, Indiatat.com, published books, and journals on the concerned issue.
- 4.6. **Tools and Techniques:** Structure questionnaire method has been used to collect the primary data from the study area. Simple statistical tools were used to analyse the collected data and used the tabulation and diagram methods to represent the analysed data. Chi-Square test has been used to test the proposed hypothesis of the current research paper.

Table 2 - Details of Respondent's Profile

5. RESULT AND DISCUSSION

5.1. Respondents Profile

The present study has taken 120 sample farmers from Hassan district to collect the primary information. The average age of the respondents was 47.9 years, and the majority (44.6 %) of the respondents were illiterates. Among 120 respondents, 32.3 percent of the farmer's income source depends on agriculture only, whereas the remaining 67.7 percent of farmers depend on both agriculture and non-agriculture sources. In this study, respondents were chosen from the marginal farmers of Hassan district who own land below

2.5 Acres. Average income of the respondents is Rupees 2.55 lakh and the average family size is 4 members. Among 120 respondents only 7.5 percent of the respondents have membership in agriculture-related associations.

5.2. Awareness of Soil test.

To use the proper mixture of fertilizers soil test is inevitable. Based on soil test results recommendation farmers will use the needed quantity of fertilizers which can be enhance the fertility of land. Regarding this, in the current paper asked three questions to the respondents to know awareness of marginal farmers about soil test. The survey result shown in the table 3.

As shown in the table 3, 88.33 percent of farmers do not have the idea on how to collect sample soil and 85.9 percent of the farmers don't know whom to contact for soil test. Contrary to these two results, 73.3 percent of the farmers agreed that, to increase productivity soil testing is essential. In the study area, only 17.5 percent of the respondents were testing their soil frequently while the remaining 82.5 percent of the respondents were not caring to get their soil tested. Farmers were given many reasons for not getting soil tests frequently. It is mentioned in figure 2.

As observed in figure 2, 28.8 percent of the respondents were not testing their soil test due to negligence. Further, 27.27 percent of the respondents were not testing their soil test due to a lack of awareness of soil tests. 17.7 percent of the respondents mentioned that they know their soil quality. That is why they were not going to test their soil periodically. 11.11 percent of the respondents opined that the soil testing process is complicated, 9.09 percent of the respondents mentioned that it is difficult to follow the suggestions given by the testing report, and 7.07 percent of the respondents opined that they do not have faith in the soil test report.

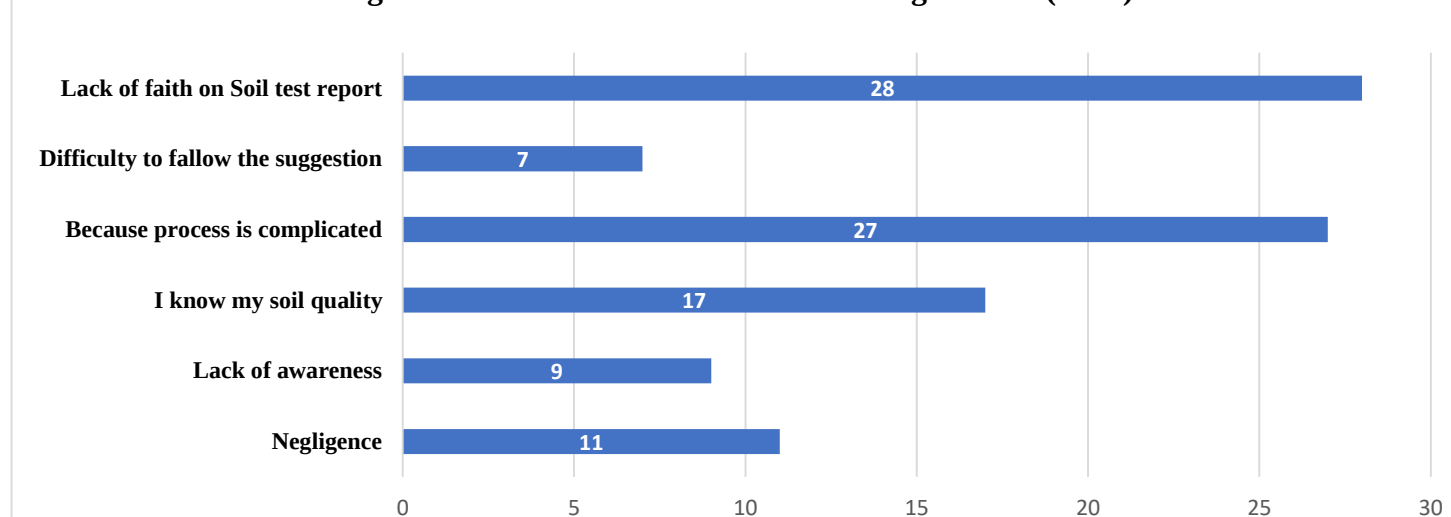
Particulars	Response
No. of Sample Farmer	120
Average age of Respondents	47.9 Years
Type of family	
Joint	15.6
Nuclear	84.4
Education level (in %)	
Up to SSLC	32.5
PUC	15.8
Degree and above	8.33
Illiterate	43.33
Source of income	
Agriculture	32.3
Non-Agriculture	0
Both	67.7
Average income	2.55 lakh
Gender (% of respondents)	
Male	94%
Female	6%
Average family size	4
Average years of experience in agriculture	23
% of Farmers being a member of any association	7.50%

Source: Primary data

Table 3: Awareness of Marginal Farmer about Soil Test

Particulars	Yes	No
Do you know how to take soil samples?	11.67	88.33
Do you know whom to contact to get soil testing?	14.1	85.9
Do you agree that the soil test is important to increase productivity?	73.3	26.7

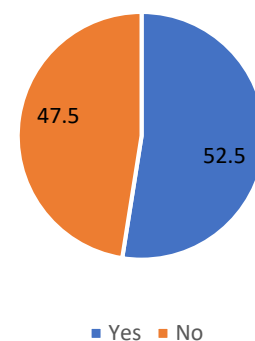
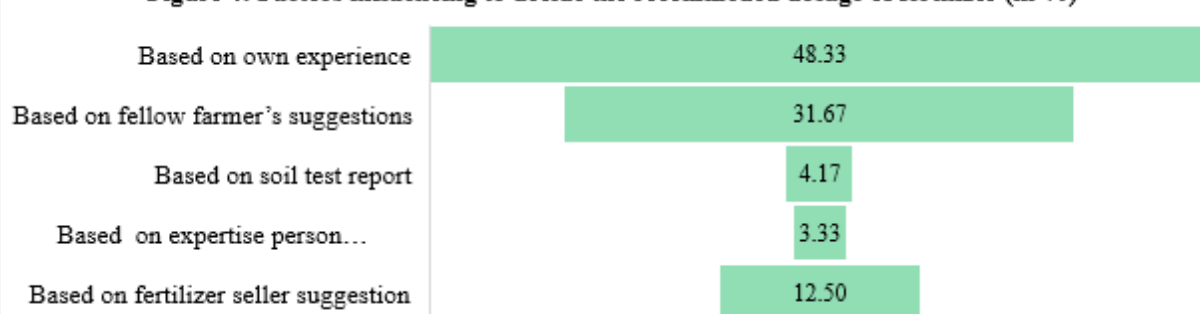
Source: Primary data

Figure 2: Details of Reasons for not Testing the Soil (in %)

5.3. Awareness of the Usage of Fertilizers.

Once the farmer knows their soil quality, the next important thing is to know the dosage of fertilizer needed to be given to the plant. Fertilizer plays a crucial role in the development of crop at the expected level. It is not easy to determine the fertilizer dosage that the particular crop demands for any inexperienced farmer. Testing the soil and following the recommended dosage is the best practice to get the expected level of growth of plants. It is also important to understand that soil test values remain varied for a period of three years and hence soil testing has to be done at least once in three years (K.B, Kannan , & B.T, 2015). However, as observed in the primary data, the majority (82.5 %) of the marginal farmer not going to test their soil frequently. In this case, farmers will follow their own method to determine fertilizer dosage for their plants.

As observed in the primary data collected from the study area, 52.5 percent of the respondents knew about the fertilizer that is used for the particular crop and the remaining 47.5 percent of the respondents opined that they don't know the different kinds of fertilizers to be used for their crop (Figure 3).

Figure 3: Farmers awareness about fertilizers need to be used for the particular crop**Figure 4: Factors influencing to decide the recommended dosage of fertilizer (in %)**

However, these marginal farmers depend on various sources to determine the kinds of fertilizers to be used. As witnessed in figure 4, 48.33 percent of the respondents are deciding the type of fertilizer to be used based on their own experience. 31.6 percent of the respondents asking suggestions from fellow farmers, 12.5 percent of the respondents blindly following the fertilizer seller's suggestion, 3.33 percent of the respondents are asking expertise person's suggestions and only 4.17 percent of the respondents used the soil testing method to determine the type of fertilizer to be used for their crop

Marginal farmers not only face challenges in deciding the recommended type of fertilizer but also in using the recommended dosage of fertilizer for a particular crop. due to various reasons, mentioned in the table 4, they are not able to follow the recommended dosage of fertilizers in their cultivation. Using the below average of recommended dosage of fertilizer causes low productivity. Certainly, it impacts marginal farmer's income levels. In the current survey, 46 percent (Figure 5) of the respondents have expressed their opinion that they have been not using the recommended dosage of fertilizer.

Table 4: Reason for not using the recommended dosage of fertilizers

	(in %)
Adequate quantity of fertilizers is not available (Not available timely)	3.64
Prices of fertilisers are high	41.82
Lack of money to purchase fertilizers	41.82
Difficult to understand and follow the recommended doses	12.73

Source: Primary data

There are several reasons not to use the recommended dosage of fertilizers by the marginal farmer which are mentioned in table 4. Due to not available of fertiliser timely 3.64 percent of the respondents were not able to use the recommended dosage of fertiliser. 41.82 percent of the respondents have not been using recommended dosage due to the high prices of fertilisers. 41.82 percent of the respondents were not been used due to lack of money and 12.73 percent of the respondents were not following due to difficulty in understanding and

Figure 5: Percentage of Respondents Using Recommended Dosage of Fertilizer's

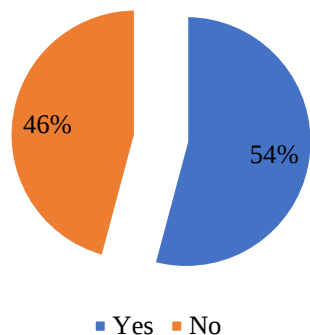
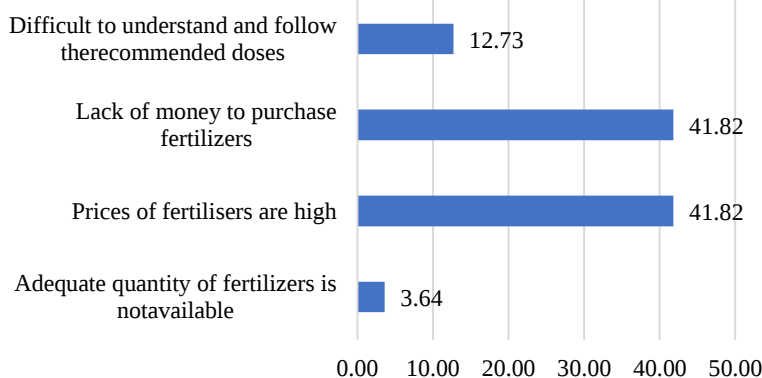


Figure 6: Reasons to not use recommended dosage of fertilizer



following the recommended doses.

5.4. Testing of the Hypothesis

Null Hypothesis (H₀): - There is no association between the level of education and awareness of farmers in the usage of required fertilizers in the study area.

Alternative Hypothesis (H₁): - There is an association between the level of education and awareness of farmers in the usage of required fertilizers in the study area.

To test the hypothesis the current study has used the Chi-square test at 5 percent of level of significance. To calculate the chi-square used cross tabulation with reference to Table 2 and Figure 3.

Table 5: Cross Tabulation of Figure 3 and Respondent's Education Level (From Table 2)

Education	Yes	No
Illiterate	21	31
Up to SSLC	26	13
PUC	13	6
Degree and above	6	4

Source: Primary data, Figure 3 and Table 2

Expected Values (E) = (Row Total x Column total) ÷ Grand Total

Table 6: Computation of Chi-Square

O	E	(O-E)	(O-E) ²	(O-E) ² /E
21	28.6	-7.6	57.76	2.01958
26	21.45	4.55	20.7025	0.96515
13	10.45	2.55	6.5025	0.62225
6	5.5	0.5	0.25	0.04545
31	23.4	7.6	57.76	2.46838
13	17.55	-4.55	20.7025	1.17963
6	8.55	-2.55	6.5025	0.76053
4	4.5	-0.5	0.25	0.05556

Source: Computed data

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

$$\Psi^2 = 8.11652$$

$$\text{Degree of Freedom (v)} = (R-1) (C-1)$$

$$= (4-1) (2-1)$$

$$= 3$$

$$p\text{-value} = 0.04$$

$$\text{Significance level} = 5\%$$

$$\alpha = 0.05$$

The tabulated value of Ψ^2 at $\alpha = 0.05$ and degree of freedom at 3 is $\Psi^2_{.05,3} = 7.815$

5.4.1. Decision

Since **calculated $\Psi^2 = 8.11652$ is greater than the Tabulated value i.e., $\Psi^2_{.05,3} = 7.815$** , the study has enough evidence to reject the null hypothesis. The alternative hypothesis specifies that There is an association between the level of education and awareness of farmers in the usage of required fertilizers in the study area. Hence, it is concluded that literate marginal farmers have more awareness about the usage of required fertilizers for any particular crop.

6. CONCLUSION

The current research paper made an attempt to know the awareness of marginal farmers in Karnataka with reference to Hassan District. From the primary data analysis, the study found that marginal farmers lack awareness about soil tests and their advantages. As the study found 88.33 percent of the respondents don't know how to collect the sample from their land and 85.9 percent of the respondents don't know whom to contact for soil tests. This is the major problem that marginal farmers face in the selection of required fertilizer and the recommended dosage of fertilizers. The majority of these farmers have been following various methods to decide these two factors such as asking fellow farmers, following the fertilizer seller's suggestions, etc. Many of these farmers decide that on their own knowledge. A soil test is important for several reasons: to optimize crop production, to protect the environment from contamination by runoff and leaching of excess fertilizers, to aid in the diagnosis of plant culture problems, to improve the nutritional balance of the growing media and to save money and conserve energy by applying only the amount of fertilizer needed (Khan, 2018, October). The result of the hypothesis test revealed that there is an association between farmer's qualifications and knowledge of fertilizer use. In this regard, adequate training can be given to marginal farmers to help them have more knowledge about soil testing and fertilizer use. This will help to improve the marginal farmer's economic situation and will help the development of the economy.

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