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DETERMINANTS OF FARM PRODUCTIVITY IN ORGANIC AND INORGANIC FARMING SYSTEM

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ABSTRACT

The major objective of this study was to determine the major common factors influencing the land productivity of Vellore region located in the state of Tamilnadu across organic and inorganic cultivation and to suggest some policy measures to promote organic farming. The sample size consisted of farmers adopting 23 organic and 20 inorganic farming system. Discriminant analysis was carried out to analyse the data. It was found that land size, number of labourers employed, number of implements used and output were the highest discriminating variables. It was suggested that that there is more scope for organic farming with proper training and knowledge through research. Organic farmers are best practitioners as well and they realize greater average yields.

KEY WORDS:

Introduction

Farming is a complex human activity consisting of farm enterprises which are interrelated and interact for the available resources and environment. It also involves application of highly sophisticated technology on one side and the physical, social and economic factors on the other. Hence, successful attainment of total agricultural development depends on the farming system approach to a large extent. Many experts have also opined that there is need to understand and analyse the existing farming systems in order to quicken the pace of agricultural development. Failure to understand the existing farming systems and the proposed improved technology might often lead to failure of the new technology. It was therefore, felt necessary that study on farming systems be taken up.

In India organic farming was practiced for decades and was part of the traditional agricultural practice. Farmers in the country were using organic methods of cultivation until the mid-1950s. After this the green revolution was introduced in India and it marked the achievement of the nation in terms of the foodgrain production capacity where in India attained self-sufficiency in terms of food availability. However this challenged the nature of this type of agricultural practice, which interms of sustainability posed a question. Thus, the need arose to find an alternative sustainable form of agriculture that took care of the health of the soil, humans and plants and at the same time was environment friendly.

Organic farming seemed to be a viable option from the perspective of a sustainable option (Bhattacharya and chakraborty, 2005). In the context of moving from green revolution to ever green revolution, several approaches to achieve it have been put forth, one of which is organic farming and other being methods that employ a mixture of different levels of traditional practices along with modern scientific methods (Kesavan et al, 2006).

Organic farming is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent feasible it relies upon crop rotations, crop residues, animal wastes, mechanical cultivation, mineral bearing rocks and aspects of biological pest control to maintain soil productivity, supply plant nutrients and to control insects, weeds and other pests (Lampkin, 1990). The significance of organic farming is stressed by Naik et al (2012) who has conducted an economic analysis of organic and inorganic cultivation of chilli and its marketing. His advice for the farmers to switch over to organic farming which minimises the environmental degradation and also brings higher net returns to compare the yields, market prices and returns of organic chilli with that of inorganic chilli. Also Anderson (1994) in his study for USA concluded that the lower yields on organic farms contrasted with conventional farms were balanced by lower production costs. The noted differences between economic performances of organic and other farms may be due to farm size rather than farming system.

India is bestowed with lot of potential to produce all varieties of organic products due to its agro-climatic regions. In several parts of the country, the inherited tradition of organic farming is an added advantage. This holds promise for the organic producers to tap the market which is growing steadily in the domestic market related to the export market. Currently, India ranks 33rd in terms of total land under organic cultivation and 88th position for agriculture land under organic crops to total farming area in the World. The cultivated land under certification is around 2.8 million hectare. This includes one million hectare under cultivation and the rest is under forest area (wild collection). India exported 86 items during 2007-08 with the total volume of 37533 MT. The export realization was around 100.4 million US $ registering a 30 per cent growth over the previous year (Kumara Charyulu et al, 2010)

Objectives

1. To determine the factors influencing farming system and
2. To suggest some policy measures to promote organic farming

Methodology

The study in this exercise is restricted to plantain cultivation. Out of 43 sample farm-operators 23 of them belonged to organic category and rest to inorganic group randomly selected in Lakshmipuram, Motham, Singarikoil villages of Vellore region. The district is primarily agrarian district with majority of its population involved in agriculture.

Primary data was collected during the months of June and July, 2013 and discriminant analysis has been applied by making use of the software SPSS.16. In this study, factors like number of labourers employed, land size, seed cost, number of implements, pesticide, manure and output were used to identify the factors discriminating between productivity(land productivity) in organic and inorganic farming. The model was specified as follows:

$Z = b1X1 + b2X2 + b3xX3 + b4X4 + b5X5 + b6X6 + b7X7$

Grouping variable Z= Discriminant total scores for organic and inorganic farming productivity (1 for inorganic and 2 for organic farming)

Where: b1.....b7 = estimated beta coefficients (weights or discriminant function coefficients) in respect of the variables X1.....X7

X1 = Land size (in acres)

X2 = Number of labour employed

X3 = Cost of the seed
X4 = Number of Implements
X5=Pesticides (organic– Neem seed cake etc., inorganic – carbandizam, mancozeb etc.)
X6=Manure
X7=Output

Results and discussion

The following table-1 provides details regarding the size of farms taken for analysis.

Table -1
Comparison between sizes of surveyed farms in acres

Farm size (in hectares)	Organic system		Inorganic system	
	Number of farms	Percentage	Number of farms	Percentage
Marginal (Less than 1.0 ha.)	8	34.78	4	20
Small (1.0 to 2.0 ha)	10	43.48	12	60
Medium (2.0 to 5.0 ha)	5	21.74	4	20
Total	23	100	20	100

Source: Calculations are based on primary data

Among the study groups it is obvious that small farmers constituted the major part i.e., 43.48 percent and 60 percent in both the groups respectively in organic and inorganic group. There were no large farmers in this particular sample groups.

Discriminant Analysis

The first step in the discriminant analysis was the estimation of univariate F-statistic and Wilks lambda. If the Wilks lambda approaches 0, it indicates significant mean difference between organic and inorganic farming. If it approaches 1, it indicates absence of mean difference. Table -2 shows the estimated F-value and Wilks lamda.

Table -2
Wilks` lambda and Univariate F- Statistics

S.NO	Variables	Wilks' Lambda	F-value
1	Land size	.997	.133
2	Labourers employed	.959	1.771
3	Cost of seed	.968	1.345
4	Number of implements	.956	1.901

5	Pesticide	.968	1.340
6	Manure	.998	.102
7	Output	.974	1.086

Source: Calculations are based on primary data

It was very clear that the Wilks lambda for number of labourers employed, land size, seed cost, number of implements, pesticide, manure and output were less than one Hence the above said factors were capable to distinguish between organic and inorganic farming.

Canonical Discriminant co-efficients

To identify the significant factors determining farming system, canonical discriminant co-efficients were calculated. The magnitude of canonical discriminant coefficients indicates the degree of contribution towards the organic and inorganic farming which is presented in table-3.

Table 3: Canonical discriminant function coefficients

S.No.	Variables	Canonical discriminant coefficients	Rank
1.	Land size	1.084	2
2.	Labourers employed	0.012	3
3.	Cost of seed	.000	-
4.	No. of implements	1.104	1
5.	Pesticide	.000	-
6.	Manure	0.000	-
7.	Output	.002	4

Source: Calculations are based on primary data

In the above table the variables such as labourers employed, seed cost, number of implements, pesticide, manure and output had positive signs indicating that these variables had higher discriminating power between organic and inorganic farming. Number of .implements used was found to be the dominant factor to determine the organic and inorganic farming systems. Hollaway et al., (2002). Shiyani et al., (2002) also found a negative relation between size of land holding to the adoption of chicken pea varieties among small holder farmers in India.

Relative contribution of the Discriminating Variables

The relative contribution of selected independent variables to organic and inorganic farming were calculated and presented in table -4.

Table 4: Relative contribution of variables to organic and Inorganic farming

Variables	**Relative contribution**
Land size	63.19
Labour employed	11.44
Number of implements	1.86
Output	23.51

Source: Calculations are based on primary data

Land size was the first dominant factor to determine the organic and inorganic farming and it alone contributed (63.19 percent) followed by output 9.51 percent,) and labour employed (11.44 percent).

Conclusion

The traditional nature of organic farming is highlighted by the fact that there is a mention of organic inputs in the ancient literatures of India like Arthasashtra, Mahabharata and Ramayana. This adds to the fact that whether it is culturally or socially organic farming seems to be a significant part of the country. The modern perspective to organic farming is highlighted by the bureaucratic certification measures that are applied to organic products to ensure their export as well as domestic consumption among affluent groups in India.

Research activities and organisations along with knowledge centers are means of collecting and spreading knowledge with information on organic farming. The regulation and promotion of international trade of environment friendly products is reflected here, using modern and updated techniques and changing the outlook on organic farming from being traditional to being more modern and sophisticated. In addition, bureaucracy seems to be more essential in terms of certification procedures to ensure the authenticity as well as trade ability of organic foods.

This study examined the factors discriminating organic and inorganic farming. Results of discriminant analysis based on the canonical coefficients, F-values and values of Wilk's Lambda showed that land size alone exhibits an inverse relationship. Land size, Number of labour employed, number of implements and output are the highest discriminating variables. It became apparent from the study, that there is more scope for organic farming with proper training and knowledge through research. After this study following recommendations are suggested:

1. Farmers should be taught about the benefits of the organic farming.
2. Concern authority should encourage the farmers towards organic farming.
3. An ideal pesticides should have to meet the following criteria.

a). Non toxic to man and domestic animals.

b). It should effectively control the pest and diseases and do not damage beneficial insect and plant species and then disappear quickly leaving no residues on crops and the soil.

c). It should not harm birds, fish and other animals in the nature in general.

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