Original Research Article

Valuation of Provisioning Ecosystem Services from Groundnut Organic Farming

ABSTRACT

Provisioning ecosystem services from organic farming requires a holistic strategy that recognizes the interconnected relationships among ecological processes, agricultural productivityand the human well-being**.**Provisioning ecosystem services includes the cultivation of crops, fisheries and timber production, etc.The present study analysed the input use pattern of groundnut organic farmers and valuated the provisioning ecosystem services i.e., food from groundnut organic farming in Tamil Nadu. Market price method was used to valuate the provisioning ecosystem services. The results suggested thatPanchakavyawas widely used by majority of the organic farmers(69.70%)demonstrating its effectiveness in promoting sustainable farming practices. Additionally, the incorporation of green manure (63.64%) and farmyard manure (54.55%) highlights farmer's commitment to increasing soil organic matter, maintaining fertility, and optimizing crop yield.The valuation of provisioning services revealed that the economic value of the provisioning services from organic groundnut farming was estimated to be Rs. 260,287. These findings provide strong support for the adoption and promotion of sustainable organic farming.

Keywords: Provisioning ecosystem services; Organic farming; Valuation; Market price; Input use.

1. INTRODUCTION

Organic farming is an agricultural approach thatfocused on sustainability, environmental accountability and the welfare of ecosystems and consumers. Unlike conventional farming, which heavily depends on synthetic chemicals and genetically modified organisms, organic farming follows a set of principles and techniques aimed at reducing environmental impact and fostering biodiversity and soil health[1].This approach emphasizes the use of organic inputs such as compost, crop rotation, and biological pest control to enhance soil fertility and mitigate the risks associated with conventional agricultural practices[2]. Organic farming has gained global recognition as a response to the environmental challenges posed by conventional agriculture, such as soil degradation, water pollution, and loss of biodiversity. Consumers increasingly seek organic products due to concerns about the potential health impacts of chemical residues in conventional agriculture and a desire to support environmentally friendly practices[3].Provisioning ecosystem services refer to the benefits that

ecosystems provide to humans in the form of essential goods and resources. These services are crucial for meeting basic human needs and supporting various aspects of daily life[4]. The production of crops from organic farming is a significant component of provisioning ecosystem services[5].Provisioning ecosystem services are essential for sustaining human life and economic activities. The responsible management of ecosystems is crucial to ensure the continued availability of these services while maintaining the health and resilience of natural environments. Sustainable practices and conservation efforts play a key role in safeguarding provisioning ecosystem services for current and future generations[6]. Keeping in this view, the specific objectives of the present study is to study the socio – economic characteristics of the groundnut organic farmers, to analyse the input use pattern of the sample farmers and to valuate the provisioning ecosystem services from groundnut organic farming.

2. MATERIAL AND METHODS

The Study was carried out during 2021-22 in Salem and Dindigul districts of Tamil Nadu. A list of certified organic farmers and their contacts was obtained from Tamil Nadu Organic Certification (TNOCD) department. Purposive sampling methodology was used to select the sample respondents. A total of 33 groundnut organic farmers were chosen from two districts. Thus, the sample size of the study was 33. The primary data were collected using a pretested interview schedule and the details regarding the information on profile of the sample respondents, input use, costs and returns were obtained from the sample respondents.

2.1 Analytical tools

Descriptive analysis viz., average and percentage analysis were used to analyse general characteristics, input use pattern, cost and returns of groundnut farmers.

2.2 Valuation of Provisioning Ecosystem Services

Market price method was used to valuate the provisioning ecosystem services. In this present study,the provisioning of ecosystem services is represented by the cultivation of a specific crop, namely groundnut.

Thus, the economic value of provisioning service was calculated by,

Economic value of Provisioning Ecosystem service = Produced food (kg/ha) x Market price of food(Rs/kg)[7].

3. RESULTS AND DISCUSSION

3.1 Socio-economic characteristics of the sample farmers

The Table.1 provides insights into the demographic characteristics, educational background, family size, farming experience, and occupation of the sample respondents.

The majority of organic farmers fall within the age group of 31 to 50comprising 60.60 per cent of the totalrespondents.The mean age of the farmers was 41.82 years.The education level of organic farmers vary with the highest percentage having primary education (30.3 per cent)followed by those with secondary education (18.18 per cent).Most organic farmers (76 per cent) have family sizes ranging from 2 to 4 members.The mean farming experience of the organic farmers was 4.18 years.Above all, a predominant number of organic farmers (58 per cent) are solely engaged in agriculture.

Table 1. Socio-economic characteristics of the sample farmers

Variables	Categories	Organic farmers (N=33)	Percentage
Age (Years)	<30	6	18.18
	31 to 40	10	30.30
	41 to 50	10	30.30
	>50	7	21.21
Mean Age		41.82	
Education	Illiterate	5	15.15
	Primary education	10	30.30
	Secondary education	6	18.18
	Higher secondary education	9	27.27
	Graduates	3	9.09
Family size (Nos.)	1 to 2	5	15.15
	2 to 4	25	75.75
	More than 4	3	9.09
Mean		3.52	
Organic farming experience (Years)		4.18	
Occupation	Agriculture only	19	57.58
	Agriculture + Business	9	27.27
	Agriculture + Service	5	15.15

Source: Field survey, 2023

3.2 Input use pattern of organic groundnut farmers

A detailed overview of the specific inputs utilized by groundnut organic farmers were given in Table 2.

The majority of organic farmers (69.70 per cent) usedpanchakavyaas an eco-friendly and effective organic liquid fertilizer that can significantly enhance the growth and yield of groundnut crops by promoting sustainable farming practiceswith a total quantity of 33.76 litres per hectare. A substantial portion of farmers (63.64 per cent) incorporated green manurewhich helps to increase the organic matter in soil and also reduce the proliferation of pests and diseases. More than half of the respondents (54.55 per cent) utilized farm yard manure which helps in maintaining soil fertility and enhanced the crop yield.

Similarly, they used neem oil followed by rhizobium (52 per cent), neem cake (48 per cent), gypsum (45 per cent), Phosphobacteria (45 per cent) and asafoetida (27 per cent) for enhancing the soil fertility, increasing the yield, suppressing the weeds and reducing pests and diseases.

It was also observed that the total organic input value incurred by groundnut organic farmers were Rs. 16821 per hectare.

Table 2. Input use pattern of organic groundnut farmers

S.No	Inputs used by Groundnut Organicfarmers	Number of respondents (N=33)	Qty/ha	Value (Rs.)
1	Panchakavya(lit)	23 (69.70)	33.76	4721.74
2	Green manure(tonnes)	21 (63.64)	5.95	133.47
3	Farm yard manure (tonnes)	18 (54.55)	12.45	675.00
4	Neem oil(ml)	18 (54.55)	6.95	361.16
5	Rhizobium (kgs)	17 (51.52)	2.03	81.26
6	Neem cake (ml)	16 (48.48)	126.02	2520.38
7	Gypsum (kgs)	15 (45.45)	326.04	880.31
8	Phosphobacteria (kgs)	15 (45.45)	2.20	85.80
9	Asafoetida (kgs)	9 (27.27)	2.50	7679.30
	Total			16820.70

Source: Field survey, 2023

3.3 Provisioning services from Organic Groundnut farming

Provisioning services from organic groundnut farming includes food production. Production of groundnut was calculated using variable cost and fixed cost approach (Table 3). The results revealed that the total cost of cultivation of groundnut was found to be Rs. 82511.70/ha which includes variable cost (Rs. 67761.46/ha) and fixed cost (Rs.14750.23/ha). Among the variable cost, human labour accounted for major portion(24.14 per cent) followed by the value of organic manures and bio fertilizers (20.39 per cent).

The yield of groundnut per hectare was found to be 3274 kg with the market price of Rs. 80 per kg.

Gross returns from organiccultivation of groundnut were found to be Rs. 260286.98 per hectare and net returns realized from organically produced groundnut was Rs. 177775.28 per hectare.

Table 3. Costs and returns of Groundnut Organic farming

S.No	Particulars	Organic farmers (N=33)	Percentage
Variable cost			

1	Value of Human labour	19915.38	24.14
2	Value of Machine power	6758.03	8.19
3	Value of Seeds	9906.00	12.01
4	Value of Organic manures and Bio fertilizers	16820.70	20.39
5	Irrigation Cost	3662.75	4.44
6	Value of post-harvest operation	8052.58	9.76
7	Miscellaneous Cost	1308.45	1.59
8	Interest on Working capital	1337.58	1.62
A	Total Variable cost	67761.46	82.12
Fixed cost			
1	Land Revenue	19.24	0.02
2	Depreciation	617.33	0.72
3	Rental Value of Owned Land	12772.73	15.48
4	Interest on Fixed capital	1340.93	1.63
B	Total Fixed cost	14750.23	17.88
	Total Cost (A+B)	82511.70	100.00
	Yield (Kg/ha)	3274.05	
	Price (Rs/kg)	79.50	
C	Returns		
	Gross Return	260286.98	
	Net Return	177775.28	

3.4 Valuation of provisioning services

Provisioning services from groundnut organic farming was valuated by using market price method. In this present study, 3274 kg of groundnut was produced with the market price of Rs. 80/kg. Therefore, the economic value of provisioning services was Rs. 260287.

4. CONCLUSION

The present study provides valuable insights into the organic farming practices adopted by groundnut farmers, revealing a predominant use of eco-friendly methods to enhance crop growth and yield. The diverse use of organic inputs including neem oil, rhizobium, neem cake, gypsum, Phosphobacteria and asafoetida, further underscores the comprehensive approach taken by farmers to improve soil health, suppress weeds and reduce pest and disease incidence.

Our study assessed the provisioning services of groundnut organic farming by employing the market price method. With a total production of 3274 kg of groundnuts at the prevailing price of Rs. 80 per kg, the economic value of the provisioning services was estimated to be Rs. 260,287. This valuation not only highlights the economic significance of groundnut organic farming but also underscores the tangible benefits provided by such sustainable agricultural practices. The results emphasize the potential for economic gains and the value of ecosystem services associated with organic farming methods, reinforcing the importance of promoting and investing in sustainable agricultural practices for both environmental and economic sustainability.

These findings support the adoption and promotion of sustainable organic farming, encouraging a shift towards practices that prioritize both agricultural productivity and environmental conservation.

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