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Sustainable agricultural waste management through oyster mushroom cultivation

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Abstract

The focus of the present study was to estimate profitability of Oyster mushroom cultivation, a sustainable way of managing agricultural wastes in malnad region of Karnataka. Five mushroom growing farmers were selected using snow ball sampling. The net returns of Rs.125.20 per kg revealed its profitability and the way it is being produced is eco-friendly will add to the sustainability. Thus, mushroom production could be regarded as a sustainable way of agricultural waste (paddy straw) management. Though, mushroom production is a profitable enterprise but it is fraught with production and marketing related constraints. In order to encourage prospective producers, government should have to provide production related subsidies and create necessary infrastructures to enable value addition.

Keywords: Net returns, agricultural waste management.

Introduction

Oyster mushroom (*Pleurotus ostreatus*) is popularly known as 'dhingri' in India. It is a common edible mushroom having rich source of protein, vitamins and fibres. These mushrooms are described as 'food delicacies' because of their characteristic biting texture and flavor. Cultivation of oyster mushroom represents large scale conversion of lignocellulosic residues into food. These mushrooms are the proficient producers of food protein from valueless agricultural crop wastes owing to the degrading ability of lignocelluloses. These mushrooms are produced on any agricultural wastes and do not demand for controlled environmental conditions and casing materials for their growth. Its cultivation not only efficiently converts agricultural wastes into nutrient rich food but also provides employment for rural folk round the year and enables them to have sustainable livelihood. The present study probe into economics of oyster mushroom cultivation in malnad region of Karnataka which is bestowed with sumptuous supply of agricultural wastes in general and paddy straw in particular.

Methodology

The study has been conducted in malnad region of Karnataka. A sample of five farmers involved in oyster mushroom cultivation was selected following snow ball sampling. Snow ball sampling is followed since the practice of oyster mushroom cultivation is uncommon. The details pertaining to the capital investment made on oyster rearing

unit and other infrastructure, labour, material inputs used in its production was elicited using pre-structured schedule. The budgeting technique was employed to ascertain labour requirement and profitability of oyster mushroom cultivation.

Results and Discussion

The details pertaining to capital investment on oyster mushroom production is presented in Table 1. The oyster mushroom production unit encompasses production unit, storage for raw materials, wooden hangings for placing cylindrical beds, bore well, chaff cutter and other accessories. The total investment made on oyster mushroom production unit came to Rs. 1014036. Out of this total investment, 49.58 percent (Rs. 502785) of investment was made on rearing unit and 29.88 percent (Rs.303030) on storage of raw materials. The dimension of rearing house and storage unit was 110'X30' and 100'X20', respectively. The rearing unit is capable of housing 500 cylindrical beds at a time. The investment on these assets is considered as imperative from the perspectives of scientific cultivation to ensure quality output. The investment on chaff cutter came to 1.48 percent (Rs.15000) and it enables mushroom growers to prepare paddy straw of desired length which serves as a substratum for the growth of mycelium. The investment on mesh stand came to Rs.5236 and is essential to drain excess water present in the substratum after sterilization.

The details pertaining to variable costs, fixed costs and returns from oyster mushroom production are presented in Table 2. The variable costs included expenditure on spawn, paddy straw, labor, fuel for sterilization and polythene covers. The operational costs formed 63.21 percent of the total cost and rest is formed by fixed costs. Among the operational costs, the cost incurred on spawn was the highest at Rs. 120000 (28.41%). The spawn is regarded as pure culture of mycelium growth and hence it is considered as crucial input. The quality of spawn is the most important factor at oyster mushroom production. The expenditure incurred on paddy straw came to Rs. 40000 (9.38%) and is a vital input which serves as basal substrate and have faster for mycelial growth rate. Labor is another major cost item which came to Rs. 39600 (9.28%) and Rs.36000 (8.44%). Mushroom cultivation requires labour to perform various operations such as preparation of substratum (chopped paddy straw), preparing cylindrical beds with substratum and layer spawning, sterilization of straw and maintenance of optimum temperature and humidity, harvesting and packing of produce to final market. Packing of substratum and layer spawning is considered as major labour consuming operations in mushroom cultivation. The investment on fuel for sterilization of paddy straw came to Rs. 27900 (6.54%). It is the simple method usually performed using large

capacity drums for 2-3 hours. Sterilization avoids contamination and ensures quality of mushroom. The polypropylene covers of 22 X 18 cm size are used to prepare cylindrical beds and an expenditure of Rs. 6000 had been incurred towards its purchase.

The fixed costs included interest on fixed capital, depreciation of machineries, rearing house, and rental value of land. Interest on fixed capital formed the major share of fixed cost at Rs.121684 (28.54%) indicating the magnitude of investment made on rearing house and machineries. It was followed by depreciation on rearing house and machineries which amounted to Rs. 32647 (7.65%). The rental value of land was formed the diminutive portion of total fixed cost. With regard to yield, 4909 kg of oyster mushroom was produced from 6000 cylindrical mushroom beds. The gross returns realized at Rs. 200 per kg came to Rs. 1140000 and corresponding net returns proceed to farmer was Rs.713669. The cost incurred and profits realized per kg of mushroom worked out to Rs. 88.82 and Rs. 125.20, respectively. The extent of profit realized expresses the remunerativeness of this venture. Thus, it could be concluded that mushroom cultivation can be practiced as a subsidiary occupation thereby by-products of agricultural activity could be efficiently reused to generate assured income and employment opportunities.

Table 1: Capital investment on Oyster mushroom

Particulars	QTY	Rate	Amount (Rs.)
Rearing unit 110'X30'			5,02,785 (49.58)
Storage of raw materials 00'X20'			3,03,030 (29.88)
Wooden hangings for placing cylindrical beds of mushroom	500	200	1,00,000 (9.86)
Chaff cutter	1	15000	15,000 (1.48)
Electronic weighing machine	1	5000	5,000 (0.50)
Bore well with 5 hp motor	1	72350	72,350 (7.13)
Mesh stand to drain excess moisture out of sterilized paddy straw	1		5,236 (0.51)
Water syntax	1		8,235 (0.81)
Drums for sterilizing substratum	2	1200	2,400 (0.23)
Total			10,14,036

Note: Figure in the parenthesis indicate percentage to the total capital investment

Table 2: Economics of Oyster mushroom production

I. Operational Cost (Rs.)			
Inputs / Particulars	Quantity (No)	Rate (Rs.)	Amount (Rs.)
Paddy straw as substratum	5000 Kg	8 /Kg	40,000 (9.38)
Spawn culture	1000 Kg	120/ Kg	1,20,000 (28.41)
Labor for sterilization of substratum, preparation of cylindrical beds and packing final products to market	120 Man days	300/man day	36,000 (8.44)
Labor for maintenance	132 Man days	300/man day	39,600 (9.28)
Fuel for sterilization	1800 Kg	15.50/Kg	27,900 (6.54)
Polythene covers to prepare cylindrical beds (No.)	6000	1.00/cover	6,000 (1.40)
Total			2,69,500
II. Fixed costs			
Depreciation			32,647 (7.65)
Interest on fixed capital			1,21,684 (28.54)
Rental value of land			2,500 (0.58)
Total Fixed cost			1,56,831
Total cost			4,26,331
Gross returns	5700 Kg	200/ kg	11,40,000
Net returns			7,13,669
Cost per kg			88.82
Net returns per kg			125.20

Note: Figure in the parenthesis indicate percentage to the total cost

Conclusion

Oyster mushroom cultivation is regarded as a sustainable way of managing agricultural wastes. It is not only sustainable but it is also profitable. The net returns accrued to farmer per kg of mushroom worked out to Rs. 125.20. The other major finding of the study is the magnitude of employment generated in this venturesome business which stood at 252 man days per year.

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