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Short Research Article

Oyster Mushroom Cultivation: a Women Friendly Profession for the Development of Rural West Bengal

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Abstract

Mushroom cultivation is considered as an alternative source of income to uplift the living standards of poor farmers and also to add high quality protein in their daily diets to eradicate malnutrition problems. *Pleurotus* spp (oyster mushroom) can easily be grown by the rural women with minimum efforts. Training was imparted during 2008 and 2009 by the Department of Plant Protection, Institute of Agriculture, Visva-Bharati, Sriniketan. The program focused on poor farmers having less than 0.5 ha of land. Training program included cultivation techniques, spawn preparation, substrates preparation, marketing of fresh product, preservation, etc. A total of 100 village women from four villages in two blocks of Birbhum district were selected for training. The knowledge level on cultivation method, food and nutritional value, economics of cultivation, profitability, etc. increased many folds after training. About 49% of trainees developed their skills in mushroom cultivation. While, 57% felt that mushroom cultivation is a profitable business and could be selected as an alternative business. An increase of 88% in total mushroom production and 89% increase in productivity were observed after training. Mushroom growers were increased from two to 19 after the training. The awareness program was very much successful in disseminating the knowledge of mushroom cultivation among the community which may contribute towards the overall development of the rural society.

1. Introduction

Agriculture is the livelihood of majority of the rural population of West Bengal, with over 90% of the cultivators as small and marginal farmers. The state has 6.2 mha of land out of which 5.5 mha are cultivated with a cropping intensity of 138%. High labor-land ratio and alarming rate of population growth may pose a threat to our food security in the very near future. Augmentation of agricultural production through expansion, training and use of improved seeds, fertilizers, agricultural kits, etc. was taken up in the state through implementation of 57 State Plan Schemes, nine Centrally Sponsored Schemes and four Central Sector Schemes during 1998-2003. But, rural transformation can not be achieved without development of farmer's capability and resource mobilization for agriculture. Still a large proportion of Indian farmers continue to be poor with low agricultural productivity. Exposition of different information and adoption of new technology are assumed to develop farmer's capability. It is important to disseminate information about new technologies so that the farmer is able to make use of the latest agricultural developments. There also exists a gap between research findings and the needs of the farmers. For technology to be successful, it is important that it should serve a useful purpose to the end user. Training is a planned process that directs learning towards achieving specific outcomes, leading to achieving performance objectives. Empowerment in the context of women's development is a way of defining, challenging and overcoming barriers in a woman's life through which she increases her ability to shape her life and environment. It is an active, multidimensional process which should enable women to realize their full identity and power in all spheres of life. In addition to their role in agricultural production, women are gainfully employed in agri-based allied activities like dairying, animal husbandry, poultry, goatery, rabbitry, beekeeping, floriculture, horticulture, fruit preservation, post-harvest technology, value added food products, etc. Cultivation of edible mushrooms is one of the most economically viable processes for the bioconversion of lingo-cellulosic wastes (Bano et al., 1979; Biswas et al., 1997; Cohen et al., 2002). Mushroom growing is one agricultural activity in which women can play a vital role

without sacrificing their household responsibilities (Bahl, 1984; Biswas et al., 2012). Mushroom cultivation is simple, low costing, labor intensive and suitable for rural areas which can provide employment in both the semi-urban and rural areas. Mushroom cultivation will improve the socio-economic condition of farmers, families and solve employment problems of both literate and illiterate, especially women. It can also be a good tool for rural development. It was observed that if proper training is given to the village workers by arranging appropriate training, the gained knowledge and skill can be passed to their fellow farmers, which will give momentum to the development of agriculture. Mushroom contain 20-30% protein, it has been recognized as the alternate source of good quality protein which is higher than vegetables and fruits and is of high quality (Banik and Nandi, 2004; Gregori et al., 2007). Considering the above, a training program on "Grow more mushroom to generate extra income for rural development" was organized in Saithiya block of Birbhum district in West Bengal by the Department of Plant Protection, Palli Siksha Bhavan (PSB), Institute of Agriculture, Visva-bharati, Sriniketan with a view to uplift the living standards of the poor farmers and also to add high quality protein in their daily diets to eradicate malnutrition problems.

2. Materials and Methods

2.1. Study area

The program was focused on poor farmers having less than 0.5 ha of land. The study was conducted in purposively selected Bolpur-Sriniketan and Sainthia blocks of Bhirbhum district of West Bengal. A total of 100 village women from four villages in two blocks, i.e. Raipur, Mirzapur, Meharpur and Nimgaria, were selected randomly for training. Thorough training on various aspects of oyster mushroom cultivation were given which included the cultivation techniques, preparation of spawn, substrates preparation, marketing of fresh product, preservation, etc. The impact of the training was assessed by parameters such as increasing numbers of mushroom growers in the block, availability of fresh mushroom in local markets, productivity, per capita consumption of mushroom day^{-1} and additional increase in monthly income through mushroom cultivation. Appropriate schedule was prepared which was pre-tested for its validity before data collection.

2.2. Initial status

Mushroom cultivation in Birbhum district was negligible during last few years although there is a rising trend in its demand but in comparison to other districts of West Bengal, the production of mushrooms was very low and only 2% farmers had the preliminary idea about the cultivation process of oyster mushroom. Most of the consumers were tribes (Santhals). They procured mushrooms from the nearby forests which was limited to specific period of a year. The climate of Birbhum district is very much congenial for cultivation of oyster mushroom and it can be cultivated more or less throughout the year. Almost 70% people of Birbhum district belong to small and marginal farmers and landless laborers. Their income level is quite low for a sustained livelihood. In order to raise their family income mushroom cultivation was considered to be an alternative source of income.

2.3. Intervention by Department of Plant Protection

Any agricultural and farm waste materials, viz. paddy straw, wheat straw, saw dust, farm yard trashes, etc. can easily be used for cultivation of oyster mushroom. Use of such waste for mushroom production is a better and profitable eco-friendly way of waste disposal. The technology involved in mushroom cultivation is very simple and can be acquired by any person after a short training. The awareness about mushroom has been created among the villagers. Issues like food and nutritional values were properly dealt with the villagers. Keeping this in mind field level demonstration (FLD) on oyster mushroom cultivation was organized in four selected villages. Extension literature was distributed among the respondents. Field day was arranged to create awareness and interest among the women for mushroom cultivation. Finally, training was imparted to the selected women.

2.4. Details of the technology

2.4.1. Raw material used

Paddy straw, polythene bags, spawns, and polythene sheets were the materials used for mushroom production.

2.4.2. Preparation of beds and harvesting

Paddy straw was chopped into small pieces (2-2.5 inch).

↓

Soaking of paddy straw in water containing Bavistin 75 ppm+Formalin 500 ppm for 12-18 h.

↓

Complete decantation of water was done and straw was air-dried by spreading on a cemented floor or polythene sheet.

↓

60-70% moisture level was maintained feeling by the hand. Excess water was removed squeezing straw by hand.

↓

Spawn was thoroughly mixed @ 4% dry weight basis.

↓

Substrate was filled in polythene bags (45×30 cm). Openings of the bags were tied with nylon string and 4-5 perforations were made at the lower portions of the bags.

↓

Filled bags were kept in dark place for spawn run. Temperature was maintained at 24-30°C and relative

humidity at 80-90%.

↓

Polythene cover was removed when the straw was fully covered with milky white mycelium (16-20 days).

↓

Compacted mass of aggregated straw bed was ready for cropping. Beds were hung with nylon string at a distance of 30 cm.

↓

Beds were watered thrice a day

↓

After 1-2 days, small primordial appeared on the surface of the bed, and finally first flush of mushrooms was harvested within 2-4 days.

↓

Mushrooms were plucked by slight pulling and twisting before they curled up. Successive 2-3 flushes were harvested from the same bed at an interval of 7-10 days.

3. Results and Discussion

3.1. Adoption of the technology and benefit to the farmer

3.1.1. Changes in perception level

The village women were inspired greatly by the easy method of cultivation, and started mushroom cultivation on a small scale and produced on an average (3.4 kg day^{-1}), which generated extra income for them. The mushrooms were included in their daily diet and supplemented additional nutrition to them. The perception and knowledge level of the respondents about mushroom and its cultivation before and after the training is presented in Table 1.

The overall perception and knowledge level of respondents were found to be changed after the training. The mind set was changed and about 97% respondents were fully conversant with the edibility of mushroom which was 30.92% higher than the previous. The knowledge and perception level on mushroom cultivation technology, their food and nutritional values, economics in cultivation, profitability, etc. were disseminated through channels like literature and FLD, which were increased many folds after the training. About 49% of respondents developed their skills in mushroom cultivation. While, 57% respondents felt that mushroom cultivation is a profitable business and can be selected as an alternative business for generating extra income.

3.1.2. Changes in production, consumption and income

The village women were surprised with the success of the mushroom cultivation. They could not just believe such a good return in less than a month period. They were motivated with the success and continued their production. The total production, productivity, and consumption of edible mushroom were increased in the area. The cultivators generated extra income. The data obtained on different parameters after the training are presented in Table 2.

The impact of training was quite satisfactory and considerable increase was noticed in all parameters investigated. Due to proper knowledge and constant supervision, the growers used more economical and scientific methods for cultivation which resulted in many fold increase in overall production of oyster mushroom in the area, i.e. from 1,140 to 25,650 kg. An increase of 89% in mushroom productivity was observed. Number of successful growers was increased from two to 19. Many farmers involved in mushroom cultivation and supplemented mushrooms in their daily diet. Per capita consumption of mushroom was also found to be increased from 22 g day^{-1} to 42 g day^{-1} after the awareness program. Mushroom cultivation was increased the level of income of farmers. An additional income of (₹ 3,982 month^{-1}) during 10 months period was generated from the mushroom cultivation which was 267.68% higher than the previous level.

3.2. Lessons learnt

The training program enabled us to learn the following lessons on decentralized extension. Involvement of multiple actors and local resource persons with target groups at the community level improves capacity to engage, relate to one another and promotes local ownership. Guidelines for initiating training program or implementing development projects need to be based on realities and local context within which rural communities live. Providing money to participants in meetings organized by development programs sets standards that affect the mutual trust and creates a dependency syndrome killing the local initiative. Team and partnership skill are key to sustainability of partnerships because different actors have different values and principles in the way they interface with local communities. This helps in creating a common vision

Table 1: Changes in perception level of respondents (N=100)

Explanatory variables	% of respondents		Increase (%)
	Before training (2007)	After training (present) 2008-2009	
Conversant with the edibility of mushroom	67	97	30.92
Oyster mushroom as food	16	47	65.95
Aware of the food value	12	75	84
Preliminary knowledge of mushroom cultivation	2	49	95.91
Profitability in mushroom cultivation	12	57	78.94

Table 2: Comparison of different variables before and after the training

Variables	Before training (2007)	After training (present) 2008-2009	Change (%)
Production level			
Total production (kg year^{-1})	1140	25650	2150
Productivity (g kg^{-1} straw)	450	850	89
Average daily production (kg farm^{-1})	3.8	4.5	18.42
Number of growers	2	19	850
Consumption level			
Total sale of fresh product in market (kg year^{-1})	680	18700	2650
Per capita consumption (g day^{-1})	22	42	90.90
Extra income			
Total benefits (₹ farmer^{-1})	10830	39825	267.72
Monthly return (₹)	1083	3982	267.68

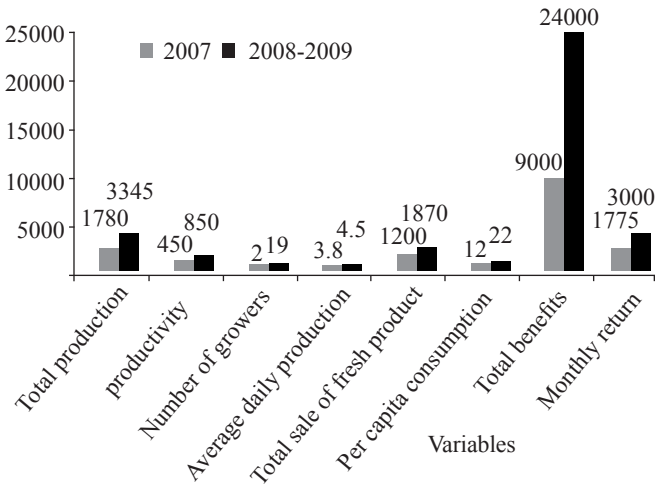

Figure 1: Comparison of differet parameters

and development strategy.

4. Conclusion

Awareness and training on mushroom cultivation helped in income generation, nutrient supplement and in profitable marketing of farm women. Nineteen farm women started mushroom cultivation and earned ₹ 3982 month^{-1} in addition to income from conventional activities. Farmers realized the importance of mushroom and incorporated it in their diet. It also provided an opportunity to strengthen the link between farmers and scientists which helped in technology dissemination and overall development of weaker section.

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