

# Mushroom as a Mechanism to Alleviate Poverty, Unemployment and Malnutrition

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## ABSTRACT

Mushroom is the most popular delicious, nutritious and medicinal vegetable in the world. Now it is considered as the most promising concept for crop diversification. It has been regarded as an effective means for poverty alleviation in less developed countries due to its potential for a quick, high return of profit on a small investment. Bangladesh is one of the most suitable countries in the world for Mushroom cultivation due to its favorable climate, cheap raw materials and labor cost and high market price. It is such an income generating concept that can alleviate poverty and eradicate malnutrition. It can also create employment opportunities for landless beggar, educated and uneducated youth, person with disabilities and adolescent men and women respectively. The primary objective of the study is to alleviate poverty, unemployment and malnutrition through cultivating and selling mushroom. The study is analytical and theoretical in nature and based on the secondary data. However, personal interview has been conducted to the mushroom farmers to depict the cost and profitability of Mushroom cultivation. The study finds that Mushroom cultivation can open a new opportunity for landless and unemployed people as it does not require any cultivable land and can be grown in a room by racking vertically. One can earn nearly TK 4-5 thousands a month by investing only TK 10-15 thousands. So, it is possible to make a handsome profit by investing a small amount of capital and labor in Mushroom cultivation.

**Keywords:** Poverty Alleviation, Unemployment, Malnutrition, and Profitability

## INTRODUCTION

Mushroom is the most popular delicious, nutritious and medicinal vegetable in the world. At present it is one of the most promising concepts for crop diversification in Bangladesh. The weather condition of Bangladesh is convenient for mushroom cultivation. On the other hand, it does not require any cultivable land and can be grown in room by racking vertically. As a result, its capital return as well as benefit per unit area is higher than any other vegetable in our country. It requires little capital, short time and trouble-free technique for cultivation. For that reason all types of people can participate in its cultivation. Hence, it can also generate huge employment opportunities for unemployed. The ingredients required for mushroom cultivation like sawdust, paddy straw, wheat straw, sugarcane baggage, waste paper, used cotton, dervishes etc are always available and cheap and no materials are not required to import from abroad for its cultivation. Moreover, no chemical components are necessary for its cultivation. It is an organic and Eco-friendly vegetable. Worn substrate of mushroom cultivation is one of the best sources of organic matter in the soil. Its cultivation may be "a lifeboat" for survival of the landless people who do not have any source other than their houses. Its cultivation can transfer as a cottage industry and create a huge prospect for export.

## OBJECTIVES

The primary purpose of the study is to alleviate poverty, unemployment, and malnutrition through cultivating and selling mushroom. To support the key objective, some others take into consideration:

- to introduce high nutritious food for people suffering severe malnutrition;
- to improve the standard of life of unemployed and beggars;
- to generate income and food security of the people.

## METHODOLOGY

The present study is of analytical and theoretical in nature and based on secondary data. However, personal interview has been conducted from the mushroom farmers to depict the cost and profitability of Mushroom cultivation. Secondary information sources have been collected from various newspapers and magazines. Furthermore, different working papers, journals and articles have been studied to enrich the literature of the paper. An intensive desk research has been undertaken to collect published data. Microsoft office package have used for summarizing and illustrating the collected data systematically.

## LITERATURE REVIEW

Mushroom (*Agaricus bisporus*) production is a lucrative and profitable cottage industry for low income rural households (Lelley, 1988) and this industry is providing full and part time employment to rural and urban poor and marginal people in many developing countries (Ferchak and Croucher, 2001). Now mushroom is being cultivated in more than 100 countries of the world and the estimated total production is over 12 million tons (Suman and Sharma, 2007). Mushroom is considered as one of the important food items since ancient time and its consumption is being increased over the period for its significant role in human health, nutrition and diseases (Suzuki and Oshima, 1976; Uddin, *et al.*, 2011). The edible mushrooms are also good source of protein, vitamins and minerals (Khan *et al.*, 1981). Recently, unemployment is increasing rapidly both in developed and developing countries. In this situation, self-employment can be one important way to increase employment rate for small, marginal poor farm households for generating employment and earning extra money. They can easily cultivate mushroom in their home yard because it requires small piece of land where mushrooms can be grown. However, market linkage is the most appropriate in the context of the farmers' involvement and the market to supply goods to consumers (KIT *et al.*, 2006; and Shepherd, 2007). Usually, marketing channel links the producers and consumers, and thereby supplying goods from producers to consumers. A large number of intermediaries are involved in the marketing channels and they earn their daily livelihoods. A few studies have been conducted which have focused on the production system of mushroom in Bangladesh (Kamal *et al.*, 2009; Zamil and Cadilhon, 2009; Amin, 2002; Amin and Ruhul 2008; Sarker *et al.*, 2007; and Uddin *et al.*, 2011). In addition, a large number of researchers have been conducting research on mushroom related production system and management (Bano *et al.*, 1979; Block *et al.*, 1958; Han *et al.*, 1977; Jong and Peng, 1975; Khan *et al.*, 1981) in India, Nepal, China, Philippines, Thailand, Taiwan, Hong Kong and Pakistan. Work is also being done on human health, nutrition and diseases in other countries in the world (Agrahar-Murugkar and Subbulakshmi, 2005; Cheung and Cheung, 2005; Gunde-Cimerman, 1999; Hawksworth, 2001).

## EDIBLE MUSHROOM VARIETIES IN BANGLADESH

The Chinese have cultivated the mushroom for centuries. A total of 300 edible mushroom species, about 30 have been cultivated. Only about 14 species can be commercially grown because of the difficulties in artificial growing. These 14 species are: Bottom mushroom, Shiitake, Common oyster mushrooms, Phoenix tail mushroom, Golden Top oyster mushrooms, Enoki, Straw mushroom, Oyster mushroom, Money head mushroom, Wood ear, Hair wood ear, Silver ear and Ling zhi.

## Nutrition Value of Mushroom

Mushrooms are a great source of B vitamins, including riboflavin, niacin, and pantothenic acid, which help to provide energy by breaking down proteins, fats, and carbohydrates. B vitamins also play a significant role in the nervous system.

Elements	Nutrition Value
<b>Pantothenic Acid</b>	Helps with the production of hormones and also plays a vital function in the nervous system.
<b>Riboflavin</b>	Helps to maintain healthy red blood cells.
<b>Niacin</b>	Promotes healthy skin and makes sure the digestive and nervous systems function properly.
<b>Minerals</b>	Mushrooms are also a source of important.
<b>Selenium</b>	A mineral that works as an antioxidant to protect body cells from damage that might lead to heart disease, some cancers and other diseases of aging. It also has been found to be beneficial for the immune system and fertility in men. Many foods of animal origin and grains are good sources of selenium, but mushrooms are among the richest sources of selenium in the produce aisle and provide 8-22 mcg per serving. This is good news for vegetarians, whose sources of selenium are limited.
<b>Ergothioneine</b>	A naturally occurring antioxidant that also may help to protect the body's cells. Mushrooms provide 2.8-4.9 mg of ergothioneine per serving of white, portabella or crimini mushrooms.
<b>Copper</b>	Helps to make red blood cells, which carry oxygen throughout the body. Copper also helps to keep bones and nerves healthy.
<b>Potassium</b>	An important mineral. It aids in the maintenance of normal fluid and mineral balance, which helps to control blood pressure. It also plays a role in making nerves and muscles, including the heart function properly. Mushrooms have 98-376 mg of potassium per 84 gram serving, which is 3-11 percent of the Daily Value.
<b>Beta-glucans</b>	Found in numerous mushroom species, have shown marked immunity-stimulating effects, contribute to resistance against allergies and may also participate in physiological processes related to the metabolism of fats and sugars in the human body. The beta-glucans contained in oyster; shiitake and split gill mushrooms are considered to be the most effective.

## Medicinal Uses of Mushroom

There are various chemical compounds found in mushrooms that reportedly have medicinal uses and benefits (Table 1). About 651 species representing 185 genera of mushrooms are reported to contain anti-tumour or immuno-stimulating polysaccharides that inhibit tumorigenesis. There is evidence that the  $\beta$ -D-glycans induce a biological response by binding to membrane complement receptor on immune effector cells. The lipid component of *Agaricus* was found to contain a compound with anti-tumour activity which was later identified as ergosterol (Takaku *et al.*, 2001). Similarly the lipid fraction of *Grifola* exhibits antioxidant activity and inhibits enzymes that cause many chronic diseases including cancer (Inoue *et al.*, 2002). The mushroom constituents not only inhibit progression

of the disease by exerting direct cytotoxicity against tumour cells (Chang, 1996) but also up regulate other non-immune suppressing mechanisms. These constituents are beneficial even in some established tumours (Bender et al., 2003) and isolates from mushroom cells have cytostatic compounds that induce apoptosis in leukemia cells. The chemicals produced by species of *Ganoderma* have antibacterial properties (Smania et al., 1999) and have been shown to inhibit the growth of bacteria such as *Staphylococcus* (Mothana et al., 2000). Steroids isolated from them are active against numerous gram negative and gram positive microorganisms (Kuznetsov et al., 2005). The mycelial extracts from *Lentinula* produce antiprotozoal activities against *Paramecium* (Badalyan, 2004). Mushrooms also have antiviral properties and several compounds isolated from *Ganoderma* are active against HIV-1 (El-Mekkawy et al., 1998; Ichimura et al., 1998) and are also known to possess antiviral activity against influenza virus type 1. Although mushroom has numerous medicinal uses, some of the attributes of them are listed here:

Table 1: Chemical compounds and attributes of Mushroom

Chemical Compounds	Attributes
Peptido glycans	Anti-tumour
Ergosterol	Anti-tumour
Lipid fraction	Anti-oxidant
Steroids, hydroquinones	Anti-bacterial
Oxalic acid	Anti-protozoal
Schizophyllan	Anti-tumour
Epicorazin	Anti-microbial
Ganoderic acid	Anti-viral (HIV)
Ganodric acid, lucidadiol	Anti-viral (influenza)
Lignins	Anti-viral (HIV)
Polysaccharides	Anti-viral (HIV)
Velutin	Anti-viral (HIV)
Illudins	Cytotoxic
Triterpenes	Apoptosis
Polysaccharides	Antiangiogenic
Hispolon, hispidin	Anti-allergic
Ergosterol peroxide	Anti-allergic

#### Why Mushroom should cultivate

- Mushrooms can be grown on small, medium and large scale to accomplish personal consumption or to start commercially.
- It can be produced and sold within 2 to 4 months. It can be sold freshly direct from the Farm or in the local market.
- Physically disabled people are fully capable of accomplishing all necessary tasks in mushroom cultivation, although some modifications in constructions and equipment may need. Specific tasks may require because of certain disabilities.
- Persistently ill or weak people can work in a cooler environment as mushrooms grow underneath the shade. It reduces physical exertion associated with open cultivation similar to rice and small fruit.

## ANTICIPATED COST AND PROFITABILITY OF MUSHROOM CULTIVATION

Among several income generating activities like dairy and poultry industries, Mushroom cultivation also has a new opportunity of earning and has become most popular income generating activity among a good number of landless farmers and unemployed people. But the farmers are facing many problems such as unavailability of spawns or seeds, inadequate loans, lack of promotion and so on. It can be grown in the small space of a farmer's own house for small scale of production and whereby they can afford to invest in a small scale capital which generates income that aids in the family support. Basically Mushroom production is labor and management intensive and it takes only a considerable amount of knowledge and capital investment to set up a production system. The farmer sells fresh Mushrooms to the Mushroom center or merchants only at Tk. 110-130 per kg. But if they can sell it in Dhaka, the price would be at least Tk.200.

Table 2 depicts how a farmer can produce mushroom with the support of a small space, capital, and labor. From the table below, we can clearly see that by investing an average amount of Taka 10000-15000 an investor can produce approximately 60-90 kg Mushroom per month. The most convenient thing in the cultivation process is that it needed a small space to cultivate the mushroom, and the labor cost is relatively cheaper than any other cultivable crops.

Table-02: Estimated Cost and Production of Mushroom Firm

Area/Size	Capital Needed	Man Power Needed (Per month)	Total Cost (Per Month In BDT)	Approximate Production (Per month)
(05feet/05feet)	12,000	02	1500	60kg
(06feet/03feet)	13000	02	900	60kg
(09feet/05feet)	14,000	02	1300	80kg
(10feet/03feet)	11000	02	1400	69kg
(10feet/05feet)	18000	02	1200	100kg

Source: Personal Interview

Table-03: Net Profit through Mushroom Cultivation

Total Production (Per month)	*Total Revenue (Per month) (BDT)	Total Cost (Per month) (BDT)	Labor Cost (Per month) (BDT)	Materials Cost (Per month) (BDT)	Net Profit (Per month) (BDT)
60kg	7,200	1,500	1200	300	5,700
60 kg	7,200	900	750	150	6,300
80 kg	9,600	1,300	1100	200	8,300
69kg	8,280	1,400	1200	200	6,880
100kg	12,000	1,200	1000	200	10,200

\* Average Price- 120 Taka per kg

Table 3 depicts that the total revenue is much higher than the total cost of mushroom cultivation and the labor, and the material cost is relatively cheaper. The average net profit in mushroom cultivation ranges from Taka 5000-10000. So, it is clear that the profitability is higher in mushroom cultivation.

## RECOMMENDATIONS

Mushroom has already been a significant crop in developed countries. Due to its low production cost and higher market price it has been found more profitable in comparison with other agro-economic crops. The study depicts that having a poor academic background and only with a little knowledge, investors made a handsome profit with their little investment. Moreover, it can be stipulated that if the educated people involved in mushroom cultivation, they can earn a considerable income from this sector. However, landless beggars can also cultivate Mushroom by taking financial help from social enterprise or NGOs like Grameen Bank, BRAC and so on. The profit margin of little capital indicates that Mushroom cultivation can be the key source of income if it can nurture professionally.

## CONCLUDING REMARKS

As the soil and climatologically situation of this region are very suitable for mushroom cultivation, Bangladesh has a vast prospect of mushroom cultivation. It is possible to create employment opportunities for landless beggar, educated and uneducated youth, person with disabilities and adolescent men and women respectively. Moreover, there is a huge prospect to earn a huge amount of foreign currency by exporting Mushroom after meeting the internal demand. Therefore, government and private initiative is required to encourage people in Mushroom farming. By providing training to the unemployed people, supply of Mushroom spawns, providing flexible loan facilities, ensuring suitable price, reducing the effects of middleman and creating better opportunity for mushroom marketing will undoubtedly bring this sector to a boom and will eventually contribute significantly to the economy of the country.

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