Mini Mission II: Spawn production and critical infrastructure development:

Most of the small mushroom growers rely entirely on commercial spawn producers, governmental or non- governmental organizations. There are 4 spawn production units in the State which include (1) Mushroom Development Centre with a production of 7.2 tons of spawn per year, (2) ICAR with a production, as per demand, of about 2.7 tons per year,

(3) College of Post Graduate Studies, Barapani producing spawn as per requirement and (4) Research Station at Tura. This needs to be enhanced and another 3 spawn production units are proposed to be added under the Mission.

Mini Mission III: Capacity Building, and Entrepreneurship Development:

The process of training and capacity building will be organized through the Mission duration for multiple stakeholders v.i.z. mushroom growers, potential entrepreneurs, farmer producer groups/organizations, co-operative societies etc. Entrepreneurship Development Programmes (EDP) will also be taken up for mushroom growers who take up mushroom production and processing. Exposure visits to successful Mushroom farms in the country will also be organized for Mushroom farmers and entrepreneurs.

Mini Mission IV: Marketing, Value Addition and Processing:

Packaging and branding to promote marketing of mushroom and mushroom by-products will be one of the major considerations. The assistance of the Meghalaya Institute of Entrepreneurship will be sought in the matter. Aggressive advertising and trade promotion through buyers and sellers meet will be taken up. Organizing awareness camps, mushroom fairs mobilization camps in 16 clusters for 5 years will be taken up by the mission.

The Mission will be implemented over a period of 5 years and will include within it concurrent evaluation and mid-term corrections wherever needed. The programme will be flexible to accommodate mid- course corrections. A comprehensive report will be prepared every year after a systematic end of the year evaluation and necessary changes will be incorporated in the Mission

Mission Funding:

The funds for the Mission will be sourced from a number of funding agencies viz., Mission for Integrated Development of Horticulture (MIDH) Government of India, the State Government funds and through Externally Aided Projects like Meghalaya Livelihood and Access to Market Project (Megh-LAMP) and the German Development Bank KfW.

Financials:

The Mushroom Mission was launched with a proposed investment of `.50 crores for five years covering 136 villages of the State, with a production target of 50,000 MT of Oyster, Button and Shitake mushrooms at the end of five years.

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Agriculture Information Wing,
Directorate of Agriculture,
Lower Cleve Colony,
Shillong-793003,
Meghalaya.

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DEPARTMENT OF AGRICULTURE
DIRECTORATE OF HORTICULTURE

MISSION MUSHROOM | 2018-2023

www.megagriculture.gov.in

hort-meg@nic.in

Lower Cleve Colony | Shillong-793003 | East Khasi Hills District | Meghalaya | India.

Introduction

Edible Mushrooms are found in abundance across the forested areas of the State because of the congenial climatic conditions for their growth. However, unguided collection of wild edible mushrooms from forest poses great danger, often resulting in fatal food poisoning. Mushroom is known since ancient times as a food item used by a section of people, collected from wild with empirical method of identification of the edible species. With the advent of scientific cultivation techniques, cultivable edible species can now be produced for safe consumption. These scientific techniques have made it possible to cultivate edible mushrooms as nutritional food, and on seeing the opportunity to enhance farmers' incomes, the cultivation of mushroom commenced in Meghalaya since 1982.

The cultivation of Mushroom in Meghalaya started with experimentation in the District and Local Research Station and Laboratories (DLRSL) at Shillong in 1981 - 82. During this period spawn was produced and trials were conducted at the lab and a few famers' locations. Encouraged by the results, a proposal was submitted to the North Eastern Council (NEC) for establishing a Mushroom Centre in Shillong, which was approved and sanctioned during 1982-83, and named as "The Regional Centre for Training and Cultivation of Mushrooms". The Department of Agriculture, Government of Meghalaya, allocated a plot of land in its existing farm at Upper Shillong and the present premises of the Centre were constructed by the NEC funds. Spawn production has been initiated at the Upper Shillong Centre for supply within the state on demand. The NEC allotted additional funds annually, till the scheme was absorbed as a continuing State Plan scheme of the Government of Meghalaya.

Training programs were started for farmers, schools, colleges, clubs etc. all over Meghalaya and cultivation of Oyster mushrooms (Pleurotus sp.) and button mushrooms (Agaricus sp.) was started as demonstrations at the centre in Upper Shillong. Training programmes were also organized for the officers and staff at the Research stations at Jowai and Tura. Given the potential for expanding mushroom to the Garo Hills region, a mushroom centre was also sanctioned and set up at the Research station in Songsangre Tura.

Nutritional Value of Mushrooms:

Mushrooms comprise about 80-90% of water, and 8-10% of fiber. In addition to these, mushroom is an excellent source of vitamins especially C and B (Folic acid, Thiamine, Riboflavin and Niacin). Minerals like potassium, sodium and phosphorus are higher in fruit bodies of the mushroom. It also contains other essential minerals (Cu, Zn, Mg) in traces but deficient in iron and calcium.

Mushroom cultivation has the potential to address several nutritional concerns of the society in terms of protein and vitamin deficiencies. Compounds restricting tumor activity such as Lentinan is widely used as a leading cancer drug in pharmaceutical industries. Ergothioneine is a specific antioxidant found in Flammulina velutipes and Agaricus bisporus, which is necessary for healthy eyes, kidney, bone marrow, liver and skin and can slow down the aging process. Antioxidants present in mushroom scavenge the free radicals present in body system and reduce cell maturity. Thus mushrooms act as anti-aging agents. A diverse collection of polysaccharides (beta-glucans) and minerals, isolated from mushroom is responsible for regulation and strengthening the human immune system.

Mushrooms are gradually becoming a popular cuisine choice in the state due their nutritional status. Mushrooms are rich in minerals and vitamins and very low on fat and sugar. Edible mushrooms contain rich proteins that are composed of theronine and valine but deficient in sulphur containing amino acids (ethionine and cysteine). The low lipid level with no cholesterol and higher proportion of polyunsaturated fatty acids makes it that much more attractive. In addition to these, mushroom is also an excellent source of vitamins especially C and B (Folic acid, Thiamine, Riboflavine and Niacin). Minerals viz., potassium, sodium and phosphorous are higher in mushroom fruit bodies besides other essential minerals (Cu, Zn, Mg) in traces but it is deficient in iron and calcium in general. Above all, growth promoting substances viz., enzymes, alkaloids, sterols, antioxidants and other undefined organic complexes are also present in mushrooms.

Table 1 Nutritive values of different mushrooms (dry weight basis g/100g)

Mushroom	Carbohydrate	Fibre	Protein	Fat	Ash	Energy k cal
Agaricus bisporus	46.17	20.90	33.48	3.10	5.70	**499**
Pleurotus sajor-caju	63.40	48.60	19.23	2.70	6.32	**412**
Lentinula edodes	47.60	28.80	32.93	3.73	5.20	**387**
Pleurotus ostreatus	57.60	8.70	30.40	2.20	9.80	**265**
Volvariella volvaceae	54.80	5.50	37.50	2.60	1.10	**305**
Calocybe indica	64.26	3.40	17.69	4.10	7.43	**391**
Flammulina velutipes	73.10	3.70	17.60	1.90	7.40	**378**
Auricularia auricular	**82.80**	**19.80**	**4.20**	**8.30**	**4.70**	**351**

Source: Stamets, 2005 (A.bisporous, P. sajor-caju, Lentinula edodes), FAO, 1972 (Pleurotus ostreatus , V. volvaceae), Doshi and Sharma, 1995 (Calocybe indica), Crison and Sand, 1978 (Flammulina velutipes and Auricularia spp).

Meghalaya Mushroom Mission

With a view to expand the cultivation of Mushroom in the state due to its high value and low volume characteristic, availability of a growing local market and its potential for export, the Government of Meghalaya envisages the implementation of the Meghalaya Mushroom Mission with an aim to scale up mushroom production in a mission mode to exploit the full potential of the sector and bring about economic prosperity and livelihood security to the farming community of the State. The Mission strives to augment farmer's income by providing an alternate source of livelihood and an activity that can be taken up during the lean season when temperatures are suitable for mushroom cultivation.

Objectives of the Mission:

i. To scale up mushroom production in the state through a cluster approach
ii. To diversify the dietary patterns of the state so nutrition and health of the citizens is improved.
iii. To focus on the value addition of mushroom and mushroom products for improved economic gain, once sufficient volumes are generated.
iv. To create adequate infrastructure and upgrade the existing Production Centres for provision of various services to the farmers.
v. To build the skill base and the capacities of potential farmers through capacity building programme.

The Mission will focus mainly on the production of Oyster Mushroom, Button Mushroom and Shiitake Mushroom. Taking into consideration the capacity to produce spawn, the target to be achieved under the Mission will increase the production from the present 27 MT to 5000 MT within 5 years. It is envisaged that more than 1000 farmers and entrepreneurs would be covered through the Mission across the state in a cluster approach.

Considering the wide range of activities to be taken up under the Mission, it is further broken down into the following Mini Missions to focus on specific components of the Mission.

Mini Mission I: Promotion and expansion of Mushroom Cultivation through a cluster approach and Farmer Producers Organizations:

This Mini-Mission will encourage the farmers to take up mushroom cultivation as an alternate income generating activity as well as an activity that is integrated into the farm business, to enhance farm income. Button Mushroom will be taken up in 8 clusters with 800 farmers where the climate is congenial to its growth. Oyster Mushroom will be taken up in 16 clusters with 100 farmers per cluster. SMEs will be promoted with start up funding whereby 100 youth will be assisted to take up the venture.