In the hill states of North-eastern region, mushrooms are a highly coveted item of food. One also comes across occasional reports about deaths resulting from consumption of poisonous mushroom. The inhabitants of Nagaland clearly distinguish between poisonous and non-poisonous type of mushrooms. This must be the case with other tribes also. But exceptions occur and deaths take place. This is the major point to note about mushrooms.

The different kinds of edible and non-poisonous mushrooms that are consumed in the region grow wild. There have been regular systematic plans at present to promote domestic cultivation of mushrooms. The Horticulture departments of almost all States do have schemes for promotion of mushrooms. And yet, commercial production of mushroom to a significant extent has not taken place so far. The efforts in this direction continue, both by the Government agencies and by voluntary social service organizations. These efforts must continue.

This particular article is written by a mushroom expert. He is, in fact, Principal Scientist at Directorate of Mushroom Research, Indian Council of Agricultural Research, Govt. of India, Solan, Himachal Pradesh. It appears that mushroom cultivation on a large scale takes place in Himachal Pradesh. The author has described different kinds of mushrooms and the methods involved in its cultivation. He also describes different varieties having different qualities. And he strongly feels that North-east can be developed as ‘mushroom bowl of the country.’

We are of the opinion that the economic development in the North-eastern region should be mainly based on land and vegetation. The areas which immediately come to mind are tea cultivation, sericulture, bee-keeping and honey production. In fact, tea is being grown profitably in Assam for many decades and it has contributed to the prosperity of the region. Lately, decentralized cultivation of tea is being undertaken by other States neighbouring Assam, mainly the hill States. As far as sericulture is concerned, muga silk production is practiced only in Assam in the entire world. Lately, a systematic effort has taken place at the initiative of Central Silk Board to cultivate food plants for Muga silk worms and also the production of Muga silk. One may also take note of the regular bamboo plantation that is proposed to be undertaken on a large scale. Ishani has already carried an important article in its earlier issue on different aspects of bamboo and its economic exploitation.

Another product with rich potential is mushroom. The author of this article has attempted to show how mushroom can be promoted and also the advantages that may follow through cultivation of mushrooms on a large scale.
The seven sister states of North-east India, along with Sikkim, present a challenge to the researchers as well as the planners when it comes to developing and selecting agro-based programmes for the economic development and socio-economic security of the poor masses. Wide variations in the demography and physiography cause further exasperations. In the current world of the free market economy, one cannot force the private sector to open industries in this otherwise terrain-hostile region. The governments too are slowly reducing their role as public entrepreneurs. It is the agro-based ventures and enterprises, which can transform the scenario. Keeping in view the difficult terrain, climate, ethnic groups with predominant tribal population, and above all the climate, mushroom production is an option with rich potential.

The NE states, located between 22N-29.5N and 89.7E—97.3E in India, have a population of about 4.5 Crores (current estimate over 2001 Census +2% annual growth) very thinly spread in an area of 2.55 lakh sq. km. The region is not easily accessible by normal surface or water transport, which is one of the reasons which inhibit the rapid economic development of this region. Arunachal, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura constitute the so-called NE, but for developmental programmes, Sikkim has also been added. As the industry is almost non-existent and agriculture is of subsistence in kind in most parts, unemployment and underemployment prevail. Any program for economic development of this region
might take into account the profitability of the venture, employment generation, suitability of the climate and liking of the people. A low volume-high value commodity venture like mushroom production is perhaps a highly suitable agro-industrial venture. It is not only highly profitable but is also labour-intensive, and above all not dependent on arable land. Mushrooms are grown indoors and rooms or huts can be raised on otherwise idle land such as slopes. The venture, being indoor, is highly suited to womenfolk. Being highly profitable and labour intensive, it can attract the youth. Unlike in rest of India, mushrooms are not alien to the NE hills. In short, the market for mushrooms in the NE hills is readymade. All the neighbouring countries except perhaps Bangladesh are also very good markets for the mushrooms.

*Button Mushrooms*

**Advantage NE**

- Varied climate (5-35°C) suitable for all mushrooms
- Abundant agro wastes (raw materials)
- Excellent domestic (local) market
- Mushrooms as food very popular with the NE Hill people
- High humidity (always above 60 per cent)
• Access to the market in the neighbouring countries (like China, Myanmar, and others can be attempted).

Though many types of mushrooms are being commercially produced everywhere, the button mushroom (*Agaricus bisporus*), Oyster (*Pleurotus* spp.), Paddy straw mushroom (*Volvariella volvacea*), milky mushroom (*Calocybe indica*) are the most popular with the growers and consumers in India. Shiitake (*Lentinula edodes*) is produced and collected only from the NE in India. The above-mentioned mushrooms require different climate regimes specially the temperature, and therefore can be grown in various regions and seasons in the NE. To illustrate the point further, button mushroom should be grown during the winters or in the hilly regions when the temperature is between 13-19°C which should be followed by the oyster mushroom when it is between 20-30°C, then paddy straw mushroom (28-35°C). Milky mushroom are suitable when it is hottest (30-40°C). In this way a crop rotation of mushrooms of the NE Region can be designed for different regions with a view to providing gainful employment throughout the year.
Though the white button mushroom is most popular in India, it requires good resource because it is grown on specially made compost, preferably pasteurized compost. Hence it can be grown by resource-endowed persons. Dhingri (Oyster) and Milky (Calocybe) mushrooms are easiest to grow and do not require much infrastructure. A room made of bricks, mud or even thatched hut is adequate. Paddy straw mushroom (Volvariella) can be grown in open under the shade of trees. These mushrooms are mostly grown on paddy straw which is available in plenty in most parts of the NE. Shiitake is being grown in Manipur on wood logs; the technology
just needs popularization in other States of the region. What the farmers need is training and seed (spawn) of mushroom to begin with. Later, some educated and enterprising individuals may go in for seed production to meet their own requirements and also for supply to other growers.

Let us have a look at the cultivation methods of the popular mushrooms in brief, with a view to gauge the resources, infrastructure and efforts needed for a particular mushroom. With this information, the strategies may be planned for different situations. Button mushroom is produced on specially made compost, which takes 28 days, by the long outdoor method of composting. Raw materials needed are wheat straw or paddy straw, wheat or rice bran, urea, and gypsum. Short method compost is very good but requires pasteurization chamber which along with boiler may cost nearly three lakh rupees. Alternatively Central Mother Unit may be established by the public sector with State or Central assistance to provide to the growers quality pasteurized compost and spawn. The growers have to keep bags in growing rooms for spawn run (mycelial colonization) at 25\(^{\circ}\) to 30\(^{\circ}\) C, and then give fresh air and lower temperature by opening of the windows and the doors to provide 14-18\(^{\circ}\) C. The crop is planned in a way to match the climate cooling down to 14-18\(^{\circ}\) C, say from October and continuing during lower temperature in November-December. As compared to the other mushrooms, undoubtedly the button mushrooms demand greater expertise and higher resources.

![Mushrooms](image_url)

**Milky Mushrooms**

Perhaps it is the oyster mushroom production with which a novice, poor farmer or woman may start. It should be followed by milky mushroom production. Oyster mushroom is grown upon simple soaked or boiled paddy straw. The wet substratum is
seeded with spawn and filled in polythene bags of four kg. After complete spawn-run, the bags turn white. The polythene is then removed. After a few days the mushrooms start appearing. It can be managed by the poorest of the poor; in fact investment is of the seed only, costing Rs 50 a kg. Similar is the cultivation procedure for the milky mushroom except that it requires casing (layering) of 1.5 cm soil layer. A growing room of mud or even thatched hut is needed. Paddy straw mushroom is the easiest of all; it is grown outdoors under the shade of the trees. Soak the paddy straw, seed it, cover with polythene and after 6-7 days remove the polythene and mushrooms start appearing.

*Paddy Straw Mushroom*

An integrated approach, missionary zeal and concerted efforts by various public institutions, departments and NGOs are of paramount importance to make the NE a mushroom bowl of the country. Various programmes aimed at rural development, employment, as well as poverty and malnutrition alleviation, both in Central as well as State sectors, have to be integrated in a manner to serve the purpose for which these were launched. As such, there is also a separate mini-mission of Horticulture for the NE, besides the main Horticulture Mission of the Central Government. Other departments like Rural Development, Tribal Welfare, both in State and Central sector should join hands in this noble cause. NGOs having local base and fully conversant with the socio-economic, cultural and linguistic scenario of the region and its people
should be involved in delivering the goods. Special attention must be paid to the post-
harvest care, processing and marketing of the mushrooms and their products;
departments concerned should be sounded and geared up to take care of the produce
for the local, domestic and international market. A mission mode and a missionary
zeal are of the utmost importance in the development of Mushroom production in the
North-east.

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Karnataka Rural Bank Staff Follow Mahatma’s Footsteps

Hindu Business Line - Chennai, India

By A.J. Vinayak

Dharwad, Oct. 12 - “Practice what you preach” was what Mahatma Gandhi
did. Now, it is the turn of a regional rural bank to follow his footsteps.

The Dharwad-headquartered Karnataka Vikas Grameena Bank (a regional rural
bank sponsored by Syndicate Bank) is on a “wear khadi movement”. In its
efforts to promote the use of khadi, the staff members at its head office in
Dharwad wear khadi every Monday.

Mr M. Dhananjaya, Chairman, told Business Line that it was a voluntary
initiative by the staff at the bank. “If we wear khadi and promote it, it will
inspire others to wear it. Every staff at the head office wears khadi on
Mondays,” he said.
Mr I.T. Sethuraman, General Manager, said that the bank’s intention is to persuade staff members in all branches to wear khadi once in a week.

Mr G.A. Puranik, an official at the bank, said that being the employees of a regional rural bank, it is their responsibility to encourage the use of khadi among people.

Mr Ullas Gunaga, another official, said that khadi has the capacity to mitigate the economic conditions of the people. When compared with the entire cloth produced in the country, percentage of khadi produced is meagre at less than one per cent. “In spite of this dismal figure, it is to be noted that it provides employment to about 15 lakh people. Under such circumstances, should the production rise to even 10 per cent, it is quite clear that crores of people would be benefited with employment opportunities,” he said.

**Lending help**

According to him, the employees of grameena banks are duty-bound to improve the living conditions of the rural people, small and marginal farmers, rural artisans and small businessmen.

“Khadi is our close associate, as it provides employment to thousands of poor people, enabling them to have a square meal. Since it is our ultimate aim also, we should actively encourage the use of khadi, not with mere words but by actually wearing khadi clothes,” he said, adding that when one person buys khadi, the person making the cloth earns his livelihood for a week.

Quoting his experience, Mr Gunaga said the staff members, who buy khadi for official use, would also buy something for their family members.

If they are satisfied with the quality, they would tell it to others and promote its use.

The bank, which has jurisdiction over nine districts in the State, has 408 branches and eight regional offices.