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1. Problems in Rural India

In India majority of population still resides in rural areas even though migration to urban areas in search of employment and better lifestyle has been in force for some time now. In rural India, the major occupation is Agriculture, and almost 65% are either self employed in agriculture or working as agricultural labor. But a number of factors including the natural calamity like uneven rainfall pattern, floods etc., have played a major role in creating a dire situation leading to increased debt to bank, moneylenders and suicide among the rural poor. This has led to increased unemployment, decrease in the farming land per family and further increase in migration to urban lands among the rural poor.

2. The solution

The high nutritional content, medicinal values and relatively unexplored domestic and foreign market makes mushroom a valuable resource for the future. In India, about 350 million tonnes of agricultural waste is generated every year and huge human resources is available in villages. Potential of mushroom can be visualized by taking China as an example. In 1978, China produced about 60,000 tonnes of mushroom only whereas the figure increased drastically to about 14 million tonnes in 2006. The share of the global market increased from 6% in 1978 to about 70% in 2006. The mushroom industry employed about 30 million people in 2006 of which only 10% were involved in actual farming. The export value stood at US\$1 Billion.

Mushroom also called 'White vegetable' is the fruiting body of the fungus. It is beneficial for health as it has high content of protein, amino acids, vitamin B12, vitamin D, folic acid, minerals and fibre. It is also considered ideal food for patients of hypertension, obesity and diabetics. Mushroom growing is relatively simple and can be taken up as individual home based activity, or on small and large scale. Since Mushroom cultivation is a labour-intensive activity, it could have great economic and social impact by generating income and employment for both women and youth. Mushrooms are relatively fast growing and some tropical mushrooms can be harvested and consumed within 10 days after spawning. By proper management and use of the different varieties, mushrooms can be cultivated year round hence generating both the income and the employment. Mushrooms can be not only in raw form but also in dried form.

3. NEIST Technology

Considering the nutritional value, NEIST Jorhat took up extensive programmes for popularizing mushroom farming technology utilizing easily available agro and plant waste. Scientific investigation regarding utility of paddy straw, turmeric plant waste, de-oiled java citronella grass, sugarcane



bagasse, tea waste and aquatic weed like hyacinth as bedding material for a number of edible mushroom species were carried out. Due to limited availability of composting materials in hilly region a suitable technology has been developed by microbial pretreatment which reduces composting time period considerably for obtaining fertile compost for cultivation and production of mushroom. NEIST branch, Itanagar has developed a simple technology for mushroom cultivation utilizing locally available millet i.e., Marowa and paddy to substitute wheat grain for production of spawn. NEIST has developed cultivation processes and technologies for edible mushroom cultivation as well as spawn production technology for medicinal mushroom namely Shiitake. NEIST has transferred the technology to a number of entrepreneurs, who are successfully commercializing the mushroom (Annexure I). At present there are 19 mushroom cultures maintained at NEIST Germplasm Bank in the Division of Medicinal, Aromatic and Economic Plants of which three namely *Lentinula edodes*, *L. edodus* (Malaysian) and *Ganoderma lucidum* are the medicinal varieties and the remaining are edible type (Annexure II).

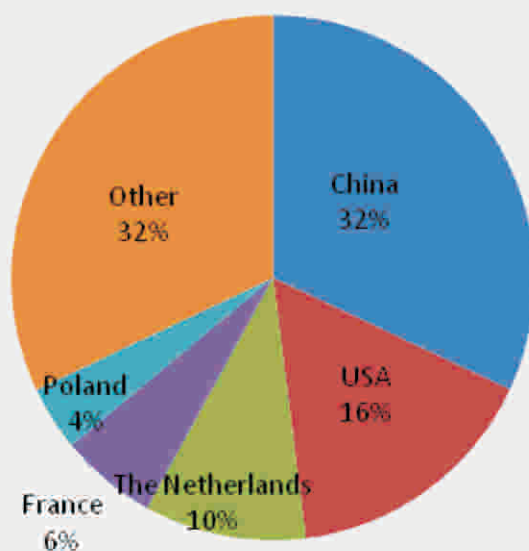
4. The Market

4.1 Global Scenario

The world market for the mushroom industry was valued at over US\$40 billion in the year 2001 and \$45 billion in the year 2005. The mushroom industry is mainly divided into three categories: edible, medicinal and wild mushroom. The edible mushroom industry stood valued at about US\$30 billion whereas medicinal mushroom products were worth about US\$9 - 10 billion, and the wild mushrooms stood at US\$4-5 billion in the year 2001. Of the edible varieties, White button mushrooms are preferably grown all over the world accounting for 35-45% of the total mushroom production. There is a big gap existing between the demand and supply of mushrooms in the United States and European market. According to the U.S. Department of Agriculture's (USDA) Economic Research Service (ERS), per capita use of all mushrooms (on a fresh-weight basis) totaled about 3.94 pounds in 2001, compared with about 0.69 pounds in 1965. In 2001, U.S. consumption of all mushrooms totaled 1.13 billion pounds—21 percent greater than in 1991. The 1999 US market for dietary supplements based mainly on mushrooms was estimated to be US\$35 million. However, in recent years, the North American demand is increasing between 20%-40% annually, depending upon species.

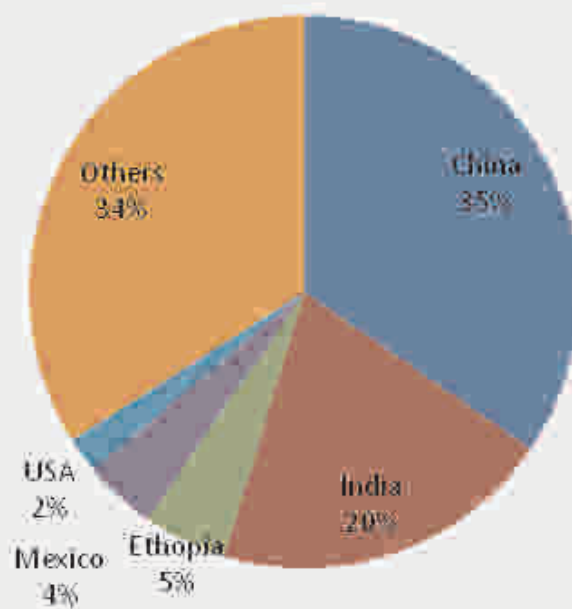


World Mushroom Production, 2001



Source : Food and Agricultural Organization

World Mushroom Production, 2006



Source : Food and Agricultural Organization



Table 1 : Mushroom Production in some countries during 2006

Country	Production (MT)	Percentage
China	34,631,320	34.64
India	20,051,440	20.05
Ethopia	4,950,868	4.95
Mexico	4,234,906	4.24
USA	2,089,385	2.09

Source : Food and Agricultural Organization

The market value of medicinal mushrooms and their derivative dietary supplements worldwide increased from about US\$1.2 billion in 1991 to about US\$3.6 billion in 1994 and US\$6.0 billion in 1999. The market value of Ganoderma-based nutraceuticals alone in 1995 was estimated at US\$1.6 billion. Ninety nine percent of all sales of medicinal mushrooms and their derivatives occurred in Asia and Europe with less than 0.1 percent in North America.

China itself is the biggest mushroom consumption market. More and more urban consumers are substituting meat products with mushrooms. The mushroom export accounts for less than 5% of its total domestic production. Production of mushrooms worldwide has been steadily increasing, mainly due to contributions from developing countries, such as China, India, Poland, Hungary and Vietnam.

4.2 Indian Scenario

In India mushroom cultivation started in the mid-sixties at Solan, Himachal Pradesh. Mushroom cultivators are usually classified into two groups namely seasonal growers and round the year growers. The seasonal button mushroom growers are confined to temperate areas such as Himachal Pradesh, Jammu and Kashmir, hilly regions of Uttar Pradesh, hilly regions of Tamil Nadu and the North East where growers take 2-3 crops of button mushrooms in a year. The all-season growers are scattered all over the country. The large scale production with the growing capacity in the range of 200 to 5000 tonnes per annum in India is located predominantly in Chandigarh, Dehradun, Gurgaon, Hyderabad, Madras, Pune, Nalagarh, Goa etc.

In the country, domestic market means the availability of mushroom being limited to cities and big towns only. Mainly the white button mushroom is grown for the domestic market as well as for export. Being a tropical country, fresh marketing is more common, except for a brief winter period. India exports



the highest quantity of the mushroom produced in the country to USA, its share being around 52% of total mushroom exports (2005-06). Other countries importing mushroom from India include UAE, Russia, The Netherlands, Germany, UK, Switzerland, Denmark, Israel, Sweden etc. In 2005-06 India exported mushroom worth Rs 139 crore. About 57% of the total export was either prepared or preserved mushroom. Within the country, average daily demand in the state of Tamil Nadu, Karnataka and Kerala lies at about 7500, 5000, and 2500 kg respectively. Average annual production of mushroom from the Tamil Nadu is over 10000 tonnes. According to the National Horticulture Board, Ministry of Agriculture, Govt of India, Punjab produced maximum quantity of mushroom with about 20000 MT followed by Haryana producing about 6800 MT and Himachal Pradesh producing about 5300 MT in the year 2007-2008 (Annexure III). There is no mention of mushroom production values from the North Eastern states of India in the Indian Horticulture Database – 2008 published by the National Horticulture Board.

4.3 Scenario in North East

4.3.1 NEIST activity

The edible mushroom was first taken up by NEIST, Jorhat in the year 1975 as a research project. It is worthwhile to mention that prior to the initiative of NEIST there was no practice of mushroom cultivation in North Eastern region. In 1994, NEIST surveyed certain indigenous varieties of mushroom available in coniferous and hard-wood forest in Bomdila, Arunachal Pradesh which were medically important due to certain polysaccharide content. The laboratory has imparted training to more than 2984 growers (Annexure IV). Under the guidance of the laboratory mushroom cultivation has come up in various places in Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram and Nagaland. The technology was initially transferred to a few growers at Kohima villages near Kohima town, Nagaland. The spawns suitable for agro-climatic conditions of the areas were distributed. Intensive training, initially at the laboratory and later on at the sites was given. In 1983 four families took up the cultivation who produced and marketed five tonnes of mushroom valued at Rs. 1,20,000/-. Gradually the number has increased and more and more families have taken up the cultivation. In Arunachal Pradesh, NEIST branch, Itanagar distributed about 2500 bags of mushroom spawns to 130 beneficiaries to start the cultivation. The beneficiaries earned about Rs. 6.20 lakhs by selling mushroom in the last two years.

5. CSIR 800

5.1 Relevance of technology

At present, 3 types of mushrooms are being cultivated in India namely the white button mushroom, the paddy-straw mushroom and the oyster mushroom. Being the most popular and economically viable to



grow the button mushroom is grown extensively throughout the world. In India though, due to its requirement of low temperature its cultivation is restricted to areas with cool climate and in the winter in the plains of Northern India. In summer, though the tropical paddy-straw variety is suitable for majority of Indian regions. But the most suitable for the India climate is the oyster mushroom as it can grow at temperature ranging from 22° to 28°C. Besides the agro-climatic conditions, other factors that make mushroom cultivation a viable proposition in India are

- Availability of cheap and abundant raw materials like agricultural waste
- Availability of labour/manpower
- Expanding Indian domestic market
- Demand supply gap in the world trade of mushroom
- Availability of Indigenously developed mushroom cultivation technologies

5.2 The Target

According to the international standards, about 80 percent of Indians are poor whereas about 45 percent of the Indians are extremely poor. According to National Sample Survey Organization, about 131.53 lakh persons are below poverty line (BPL) in NE region alone including Sikkim. The BPL in the year 2000 was reported at 33.47 per cent in Arunachal Pradesh, 36.09 per cent in Assam, 28.54 per cent in Manipur, 33.87 per cent in Meghalaya, 19.47 per cent in Mizoram and 34.44 per cent in Tripura. Though the percentage is less the highest no. of BPL persons are in Assam, i.e., about 92.17 lakh. Mushroom cultivation is already widespread in the states like Himachal Pradesh and Uttaranchal. It has started to attract people in the states of Tamil Nadu, Karnataka and Kerala. The cultivation of mushroom is found to be suitable in some districts of these states. Another state which has stated to show interest is Bihar. Considering that poverty ratio in rural population is 42.1% and 34.6% in urban population mushroom cultivation may be taken as one of the technology for CSIR 800 to uplift the economic status and enable these population earn a sustainable income.

6. Business Model

6.1 Structural framework

The mushroom cultivation will involve three different level of participation, each with distinct functions. The participating bodies will include NEIST, Jorhat, an NGO and SHGs/Entrepreneur.



NEIST – Training & Technical knowhow provider

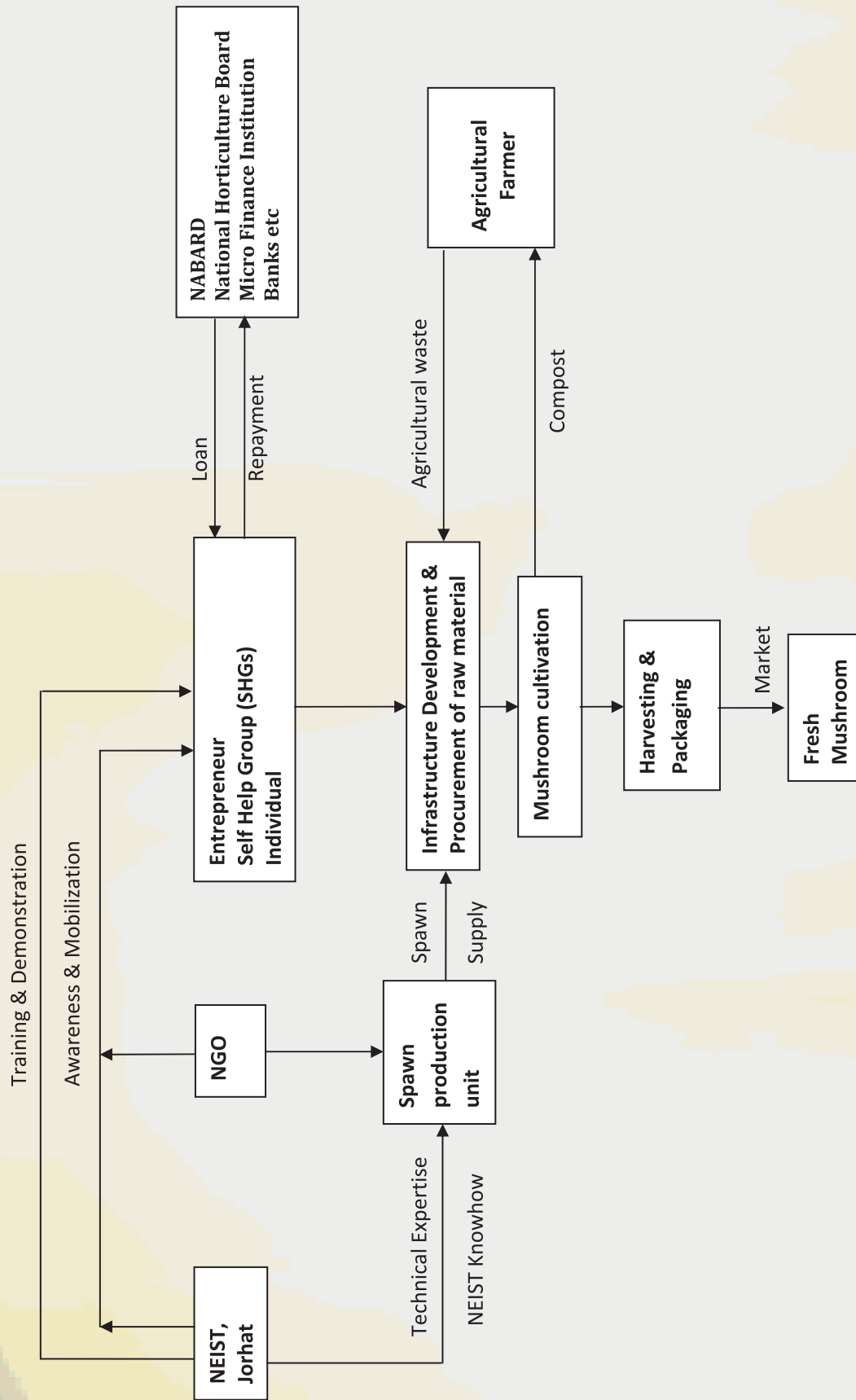
- Mobilize people by organizing awareness campsh/programmes
- Assist in establishing Spawn Production Unit
- Provide technical knowhow and guidelines on mushroom cultivation to entrepreneur/SHGs

NGO – Establish Spawn production unit

- Mobilize people by organizing awareness camps/programmes
- Help the entrepreneur/SHGs to get the initial loan from Banks etc
- Establish & run Spawn production unit
- Supply spawns continuously to entrepreneur/SHGs
- Keep updated information on market demands, buyers and act to establish a link between entrepreneur/SHGs and the buyer
- Assist the entrepreneur/SHGs in marketing

Entrepreneur/SHG – Producer

- Responsible for infrastructural setup
- Raw material procurement
- Cultivation of mushroom
- Harvesting
- Selling of product i.e., Edible Mushroom



BUSINESS MODEL





7. Method of Operation

7.1 Awareness & Motivation

The first step would be to hold awareness camps/programmes which would highlight the significance of taking up mushroom cultivation and benefits in terms of monetary, health wise and others. The awareness programme would act as motivating factor thus prompting people to take up mushroom cultivation as a profession. This would be done in collaboration with an NGO active in that locality. The resource persons involved would be from NEIST. The NGO will further take up the responsibility of assisting in Self Help Groups (SHGs) formation or assisting an entrepreneur and coordinate with NEIST for providing further training to SHGs.

7.2 Training to SHG Members

The training may be provided at NEIST, Jorhat or at the location as deemed necessary. The training would involve providing information and practical demonstration of the cultivation practices. The training would also include information on marketing strategies.

7.3 Arranging Finance

Here, the NGO will play a major role. It will assist the entrepreneur/SHGs in procuring finance from various sources like Micro finance institutes, National Bank for Agriculture and Rural Development, National Horticulture Board, Banks etc.

7.4 Infrastructural Setup & Raw Material Procurement

The next step would be for the entrepreneur/SHGs to setup the infrastructure and procurement of raw materials required for mushroom cultivation. The mushroom cultivators will require raw materials like spawns, paddy straw, and fungicide/insecticide etc. Agricultural waste can be procured from the farmers involved in agricultural farming from the nearby area.

7.4.1 Support function

Here the NGO will be responsible for setting up of a Spawn Production Unit. The NGO will also be responsible for running of the unit. The technical knowhow for the Spawn Production Unit will be provided by NEIST, Jorhat through a Memorandum of Understanding (MoU) between the two. The unit will cater to the spawn requirement of all the entrepreneur/SHGs of the nearby areas who will undertake the mushroom cultivation.



7.5 Cultivation

After setting up the infrastructure and acquiring the raw materials the SHG members will next be involved in the cultivation and harvesting activity. Mushroom being an indoor crop is grown on specially prepared compost made out of paddy/wheat straw, wheat bran, urea etc. Propagation is done through spawn. The spent compost which is a byproduct and is a good source of manure can be supplied to agricultural farmers to be used in their field. This compost is an eco-friendly substitute for the chemical fertilizer.

7.6 Progress made so far

NEIST has established a Mushroom Germplasm Bank in its premise. The institute also established seven number of spawn production laboratories of which 4 are in Assam, 2 are in Mizoram and one was recently established in Arunachal Pradesh. The Institute has also tied up with 9 NGOs for extension activities. NEIST has been actively participating in societal development using various technologies developed by the Institute, one of which is mushroom cultivation. Under the same, a total of 21 districts from six different states of North Eastern region of India have been covered. During the last ten years more than 3000 farmers have benefitted by undergoing training organized by NEIST, Jorhat.

Table 2 : Area developed under societal mission by NEIST, Jorhat

State	No of Districts covered
Assam	9
Arunachal Pradesh	2
Manipur	2
Meghalaya	1
Mizoram	3
Nagaland	4

8. Project-Economics

For Oyster Mushroom (5 kg fresh mushroom per day for 240 days/yr)

1. Yield capacity = 1000 kg/yr
2. Land requirement = 250 Sq feet
3. Present market price = Rs. 60/kg (in India approx)

Profit

- a) Selling price per kg = Rs. 60/kg



b) Yield (5 kg x 200 days)	=	1000 kg
c) Cost of production for 1000 kgs	=	Rs. 25,000.00
d) Gross annual income	=	Rs. 60,000.00
e) Net Income/month	=	Rs. 3,000.00 approx.

9. Benefits

Employment generated

Mushroom cultivation is a labour intensive activity. The fact that it can be taken up on different scales like home-based, small scale or large scale, it is a wonderful employment generating activity especially the less developed countries.

Health

Mushroom is nutritious vegetable with high content of protein, Vitamin B12, Folic acid, lysine and tryptophan amino acids, and a natural source of vitamin D also. The protein content varies between 19-40% on dry weight basis and 3.5-4% on fresh weight basis. The degree of digestion of mushroom protein is between 72-83%. It is rich in fibre, minerals, and has moisture content of about 70-95% in fresh and 10-13% in dried mushroom. The fat content in different species lies in the range 1.1-8% on dry weight basis. Per 100 grams, it gives about 18-29 Kcal of calories. It has low sodium value. Patients suffering from hypertension, diabetes and obesity can also enjoy mushroom.

Reduce Environmental Pollution

Wastes such as cereal straws are largely burnt by the farmers, which causes air pollution. However, these raw materials can actually be used for the cultivation of mushrooms. This kind of bioconversion exercise can greatly reduce environmental pollution.

Improve Quality of Life

The harvested fruiting bodies can be sold in local markets for additional family income. Some warm mushrooms, e.g. *Volvariella volvacea* (Straw mushrooms) and *Pleurotus sajor-caju* (Oyster mushrooms) are relatively fast growing and can be harvested in 3 to 4 weeks after spawning. It may be taken up by members of the family who are not involved in outdoor jobs.



Eco-friendly cultivation technology

NEIST generated technology is eco-friendly and doesn't generate pollution. Moreover, the spent agricultural waste can be used as compost or animal feed.

Minimal Land/Space requirement

Compared to other cultivating activities, requirement of land for mushroom cultivation is very little and hence can also be taken up by an individual as home-based activity for either income generation or addition to family income.

10. WHAT NEIST OFFERS

- Short term training and demonstration programme
- Provide advisory services
- Transfer of mushroom spawn development technology
- Mushroom spawns

11. Successful Entrepreneur

Pranjal Baruah – The Mushroom Man of Assam



Pranjal Baruah, CEO, Mushroom Development Foundation

His Mission is to make the marginal and poor farmers of North East India economically sound and sustainable through mushroom. He is Pranjal Baruah, a name well known across Assam for he is the Mushroom Man of Assam. Today his name has become synonymous with mushroom. It is because of his dedication and hard work which led the US based global non-profit organization Ashoka Innovators for the Public to confer him with the prestigious Ashoka fellowship in 2003 for being a leading social entrepreneur in building the capacity of the mushroom farmers for the lab to land strategy. He has also been awarded a grant of 15,000 US\$ by the Clarence Foundation, USA in an international competition for finding the best solution on alleviation of poverty in 2004. Recently in December 2009, he also won the prestigious 'Wantrapreneur 09' business plan award which was organized by Villgrow.



The Journey

Born and brought up in Guwahati city and as an Arts graduate, his interest in the mushroom cultivation was accidental. But his inner instinct and enterprising zeal prompted him to do something which not only helps improve his own economic status but also that of the society at large. He foresaw in mushroom the vast potential to become a tool in alleviating poverty and ever since he has turned it into his passion. His journey began with training at Shanti Sadhana Ashram, an NGO at Guwahati. His thrust for knowing every aspect of mushroom cultivation then led him to North East Institute of Science & Technology (then Regional Research Laboratory), Jorhat, where he rigorously pursued the Institute's scientist especially Dr R K Adhikary. He learned finer details of mushroom spawn production and cultivation. In the same year he also took Edible Mushroom technology from NEIST in 1995. He established his Spawn Production Laboratory 'Protein Food' in front of NEIST, Jorhat. Proving his foresight and turning a successful entrepreneur he repaid the loan of about Rs 2.45 lakhs within six months time. In 1996 he shifted his laboratory to Lamb road, Guwahati and later still in 2000 to its present location in Directorate of Agriculture campus, Khanapara, Guwahati. The lab at present is producing about 1000 packets per day but it is capable of producing almost 4000 packets per day. Meanwhile he along with some concerned people formed a registered society the 'Mushroom Development Foundation' in 1997. The society focused on exposing the small and marginal farmers to the market economy through mushroom. To popularize mushroom he opened an exclusive mushroom outlet and a mushroom fast food joint 'Mushroom Point' in 2004.



1) Spawns produced at Protein Food



2) Mushroom strain being tested at Lab



3) MDF mushroom collection and distribution van



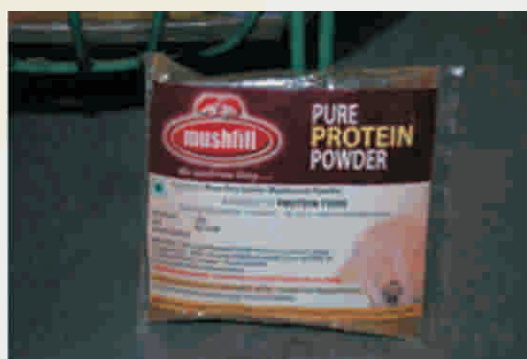
He successfully built a brand 'Mushfill' under Protein Food in 1999 which sold a variety of mushroom based products like dry and fresh mushrooms, protein powder, pickles, papads, soups, cosmetic products etc. In 2004, it earned about Rs 6 crores from different products made from 600000 kg of mushroom. The brand faced a setback in 2004 due to massive floods in Assam which wiped out the system but he never lost hope because he knew the potential inherent in mushroom. He re-established the business but this time he developed a different approach.



Dry Mushroom



Mushroom Pickle



Protein Powder

In this direction, he developed a way where he could link mushroom cultivation by marginal farmers and market to keep it viable. In 2005, he along with his MDF members and volunteers (mainly the local farmers) did a baseline survey of 50 villages of the Sonapur areas of Kamrup district and ultimately screened 1000 families to form a cluster. The criteria being that these families were either interested or could benefit economically by taking up mushroom cultivation. These families were given training and were provided the initial infrastructure to start production. Through his hard work and determination, at present about 200 families are involved in commercial production of mushroom. The average monthly income of these families have gone up by Rs 3000-5000. MDF buys back the mushroom produced by the farmers who are unable to find markets for themselves. This removes the problem associated with finding a regular market for the product which is most often the major problem in putting a break in cultivation by marginal and small producers. Within a short span of three years about 48000 kg of production has been achieved.



1) Mushroom cultivation hut



2) Ms Dayali Deuri, Jalukabari village, Assam boiling rice husk



3) Ms Ritamoni Deuri, Jalukabari village, Assam in her mushroom cultivation hut

Mr Baruah has set a target of making at least 25000 people to directly benefit from mushroom cultivation by 2015. To achieve this already another cluster has been formed at Khonoma, Nagaland where farmers have started the second round of production. Three more clusters at Makum in Tinsukia district, Assam, Garo Hills in Meghalaya and Nirjuli in Arunachal Pradesh are in the pipeline. It will not be wrong to say that he has come a long way and truly established himself as the 'Mushroom man of Assam'.



Annexure I : List of some entrepreneurs to whom agro-technology on Edible Mushroom is transferred

- * Dilzvon Angami
Kohima, Nagaland,
- * Little Flower School
Nagaland,
- * T Keviyiesa
D-Block, Kohima, Nagaland,
- * Brig. Vishwanathan,
Assam Rifles, Nagaland Range, Tuensung.
- * Director of Agriculture
Govt of Nagaland, Kohima
- * Nilakanta Chaliha
Chungajan, Golaghat, Assam
- * Department of Agriculture
Government of Assam
- * Department of Industries
Government of Arunachal Pradesh
- * District Rural Development Agency
Dhubri, Government of Assam
- * Agriculture Department
Government of Arunachal Pradesh, Itanagar
- * Arunachal Pradesh Forests Corporation
Itanagar, Arunachal Pradesh
- * Department of Agriculture Horticulture
Government of Assam, Guwahati, Assam



- * Moubandh Tea Estate
Moubandh, Jorhat, Assam
- * Mrs Lod Yamin
Hapoli, Arunachal Pradesh
- * Mrs Mumtak Qhyi
Naharlagun, Arunachal Pradesh
- * NERIST
Itanagar, Arunachal Pradesh
- * Mrs Osak Partin
Naharlagun, Arunachal Pradesh
- * Mr SD Narayana
Khonsa, Arunachal Pradesh
- * Department of Agriculture
(Horticulture)
Government of Nagaland
- * Assam Rifle
3 MGR
C/o 99 APO Rowiah, Jorhat, Assam
- * SDO (C)
Tuli, Government of Nagaland
- * Department of Agriculture (Horticulture)
Government of Assam, Khanapara, Assam
- * Tai Cultural Home
Namrup, Assam



- ❖ Pranjal Baruah
Protein Food, Jorhat, Assam
- ❖ Sanjibani Agro Products Margherita, Assam
- ❖ Agro Industries Development Corporation Ltd
Guwahati, Assam
- ❖ Namdeurigaon Anchalik Mushroom Society
Jorhat, Assam
- ❖ Karbi Nimso Chingthun Asong
Karbi Anglong, Assam
- ❖ Mrs J Saikia
A T Road, Dhapkata
Jorhat 785006, Assam

Annexure II : Mushroom varieties maintained at NEIST Germplasm Bank

Common name	Species
Oyster Mushroom	<i>Pleurotus citrinopileatus</i> <i>P. cornucopiae</i> <i>P. djamore</i> <i>P. eryngii</i> <i>P. flabellatus</i> <i>P. florida</i> <i>P. ostreatus</i> <i>P. sajor-caju</i> <i>P. sapidus</i> <i>P. platypus</i> <i>P. euos</i>
European White Button Mushroom	<i>Agaricus bisporus</i> <i>A. Bitorquis</i>
Paddy Straw Mushroom	<i>Volvariella volvaceae</i> <i>V. diplosia</i> <i>Calocybe indica</i>
Medicinal Mushroom	<i>Lentinula edodes</i> (Shiitake) <i>L. edodus</i> (Malaysian) <i>Ganoderma lucidum</i>



Annexure III : Mushroom production in India

State	Production (MT)	
	2006-2007	2007-2008
Haryana	6700	6800
Himachal Pradesh	5300	5300
Jammu & Kashmir	600	100
Punjab	20000	20000
Rajasthan	700	700
Uttar Pradesh	4000	4000
Total	37300	36900

Source : Indian Horticulture Database – 2008

Annexure IV : Some recent training and demonstration of Mushroom cultivation Technology organized by NEIST, Jorhat

ASSAM

» Deotolla village, Assam

NEIST Branch, Itanagar, Arunachal Pradesh organized one day training in Deotolla village, North Lakhimpur, Assam in collaboration with UDDAYAN, a Self Help Group (SHG) at Deotolla village on 29 November, 2009. A total of 15 beneficiaries participated. About 30 packets of mushroom spawns were distributed among the beneficiaries free of cost.

» Jenjraimukh, Majuli, Assam

A two days training programme was held at Jenjraimukh, Majuli during 26-27 October, 2009. More than 20 trainees from nearby localities underwent the training. Mushroom spawn and polythene bags were distributed among the beneficiaries to initiate production. NEIST-Jorhat is going to establish a Mushroom Spawn Development Unit at Jenjraimukh for the benefit of SHG beneficiaries of Majuli.

» Sivasagar, Assam

Under CSIR rural development programme "Rural development through aromatic plants and Mushroom and their processing in N.E India" training was organized at Shanti Shadhana Ashram, Sivasagar, Assam during 20-22 October, 2008. Altogether 45 trainees from nearby villages participated in the programme with great enthusiasm. NEIST, Jorhat is setting up mushroom spawn development unit at the premises of Shanti Shadhana Ashram, Kalugaon, Sivasagar, Assam.



▶▶ **Jairampur, Assam**

12 June, 2005 at Jairampur jointly with RK Massang Memorial Society under a DBT funded project.

▶▶ **Abhayapuri, Bongaigaon, Assam**

Two days short term training programme during 19-20 April, 2005 on aromatic plants and mushroom cultivation was organized by a local NGO 'Prayas' at Abhayapuri town. Scientist from NEIST, Jorhat conducted the training programme to 37 trainees comprising ST, weaker group of population- the tea garden labourers of the area.

▶▶ **Nalbari, Assam**

A three days training cum demonstration camp was held at Manav Shakti Jagaran, Kairara village Nalbari, Assam during 11-13 January, 2005, where more than 50 trainees from villages attended the programme. Free spawn packets, poly bags were distributed among the trainees during the programme.

▶▶ **Golaghat, Assam**

29 September, 1997 with joint efforts of 'Krishi Bikas Kendra', an NGO. More than 50 unemployed youths took part.

▶▶ **Training imparted to SC/ST population during 1995-98**

Location	Year	No. of training organized	No. of trainees participated
Jorhat District:			
Namdeori gaon	1995-96	9	203
Sonari, Kalbari	1996-97	9	207
Dhankhuloi & Jorhat	1997-98	4	70
Karbi Anglong District			
Diphu	1995-96	11	321
Donkamokam	1996-97	15	189
Kheroni & Hamren	1997-98	9	127
Total		57	1117



MIZORAM

►► DBT sponsored programme

NEIST, Jorhat covered 5 villages in Mizoram where training and demonstration on mushroom farming technology to more than 1070 growers was imparted under a DBT sponsored programme. This resulted in the unique practice of growing mushroom through organized cultivation in three districts of Mizoram.

Location	No. of training organized	Total no. of Trainees attended
Nalbari Koirara, Poyla, Gopal Bazaar, Barama, Tamulpur, Gopinathpur	5	519
Kamrup Basistha, Sonapur, Khetri, Teteliguri, Chamota, Robingaon	4	484
Jorhat Teok, Titabar, Koronga, Bahona, Kakajan, Dergaon, Jorhat	5	510
Total	14	1513

►► Mushroom training imparted to SHG beneficiaries during 2004-2007 in various locations of Mizoram

Locations	No of training organized	Total no of trainees attended	SHG engaged in cultivation	Remarks
Aizwal	4	273	17	Awareness
Sangau	4	307	23	Programme
Saiha	4	207	18	Organized -17 Spawn Lab
Serchip	5	285	21	Established-02 NGO tied up-01
TOTAL	17	1072	79	



» Aizwal, Mizoram

A three days intensive training programme during 14-16 November 2006 was organized at Serchip and Lengui village near Aizwal, Mizoram under DBT sponsored project "Promotion of intensive cultivation of edible mushroom in certain ST population of Mizoram for socio economic development" more than 90 rural villagers attended the training programme. Efforts were made on introduction of promising mushroom species like *Lentinula edodes*, *Agaricus bisporus*, *Pleurotus djamore* and *P. cornucopiae* for nutritional support and good return.

MANIPUR

» Imphal, Manipur

A two days training programme on aromatic plants and edible mushroom was organized at Imphal, Manipur in collaboration with Department of Forest, Govt of Manipur. Efforts were made for introduction of Shiitake mushroom (*Lentinula edodes*), Oyster mushroom species like *Pleurotus sajor-caju*, *P.ostreatus* and *A.bisporus* to the local growers of Senapati district. More than 50 trainees participated in the programme organized during 20-23 August, 2005.

NAGALAND

» Wokha, Nagaland

In collaboration with Yanki Muli-Purpose Welfare Society Ltd, a local NGO from Chukitung near Wokha, Nagaland a training-cum-awareness programme on Mushroom cultivation was organized during 29-30 January, 2009. Altogether 64 beneficiaries underwent training. Mushroom spawn packets and poly bags were distributed among the trainees to start with the cultivation. NEIST, Jorhat is setting up a mushroom spawn development unit in the center at Chukitung for the benefit of rural growers.

TRIPURA

» Gandhigram, Agartala, Tripura

A two days training programme was held at organized at Gandhigram, Agartala, Tripura during 11-12 November, 2009. Baba Sahib Ambedkar Janakalyan Sanstha, Gandhigram, Tripura a local NGO came forward to establish a mushroom spawn development unit at Gandhigram under technical guidance and financial assistance from NEIST, Jorhat. More than 60 interested growers from Gandhigram and nearby villages participated in the programme.



ARUNACHAL PRADESH

▶▶ A special Rural Development Programme, CSIR-800 Programme for the 'AAM ADMI' with the aim to engage rural farmers for production of protein rich mushroom within 100 days was held at Borum village, Arunachal Pradesh on 16 July, 2009. Total 62 nos. of beneficiaries from seven nos. of self help groups (SHG) actively participated. Mushroom spawn packet along with polybags for cultivation were distributed among the participants accordingly.

▶▶ One day training held at NEIST Branch Laboratory, Itanagar on 18 January, 2005. About 100 participants from Naharlagun, Itanagar, Yupia, Doimukh, Nirjuli, Sennua, Along, Bolen, Jairampur, Pistana and Banderdewa attended.

▶▶ Short term training on spawn making and cultivation technique of edible mushroom (winter variety) was held January 1987 for the local growers of Arunachal Pradesh at the Itanagar Branch Laboratory.

At NEIST, Jorhat

▶▶ A two days workshop on orientation programme for SHG, NGO & Grass root level workers on rural technologies was organized at NEIST during 6-7 May, 2009. Altogether 30 participants from different district of Assam attended the workshop.

▶▶ Five days orientation programme for the representative of All Mizoram Farmers Union (AMFU) from Aizwal, Serchip and Sangau underwent specialized training on mushroom cultivation and mushroom spawn development technique at NEIST, Jorhat, Assam during 10-15 September, 2006.

▶▶ 10 June, 2003 on mushroom cultivation covering food and nutrition aspect for the students of North East Institute of Management Science (NEIMS). 17 students along with faculty members participated.

▶▶ Short term training on different aspects of Mushroom cultivation during 19-25 September, 1991. Trainees from Assam Hill Area Development, Govt of Assam, Civil Administration, Tuli, Govt of Nagaland, Assam Rifles, Sewa Kendra, Bokajan, Boragaon Tea Estate, Baliyan Tea Estate, Rajmai Tea Estate and Moubunda Tea Estate took part.