Part Ⅱ Mushroom for Better Life

Chapter 9

Mushroom Growing Project

PILOT MUSHROOM CULTIVATION PROJECT IN NEPAL

Clare Murray
The Esther Benjamins Trust, The Business Village, 3-9 Broomhill Road, London SW18 4JQ, The U.K. (ebtrust@hotmail.com)

Project Outline	
Duration	August 2004 (ongoing)
Location	The Makwanpur District
Goal	Rehabilitation of circus returnees by vocational training that will benefit themselves, their families and the community as a whole
Beneficiary Groups	Circus returnees and their families
Participating Organizations	The Esther Benjamins Trust, The Nepal Child Welfare Foundation

Background

Rescue

The plight of hundreds of children who were trafficked from Nepal to India to work in the circuses came to our attention in 2002 when the Esther Benjamins Trust commissioned the first undercover survey into the problem. The research then and subsequently conducted revealed that over 300 children, mostly Nepali, mostly girls and some as young as five were trapped as circus performers under illegal contracts. The children described the terrible conditions inside the circuses and the long hours they were made to work rehearsing and performing often dangerous acts. They received little food, no healthcare and no education, suffering physical and sexual abuse. The Esther Benjamins Trust (EBT) alongside our partner organisation, The Nepal Child Welfare Foundation (NCWF), was helping to return these lost children and young people to their homes and provided the support and training to enable them to reintegrate into society. The EBT aimed to see the end to the use of child performers in Indian circuses by 2007.

Figure 1. Nepalese girls performing stunts in an Indian circus

In addition to the children and young people that EBT and NCWF helped to bring back to Nepal there were many circus performers who returned to Nepal on their own at the end of their contracts, whom EBT and NCWF also support. All of the circus returnees found it extremely difficult to settle back into life in Nepal as they were stigmatized as 'show girls' and they were unable to earn an income as they had no skills beyond those learned in the circus. Most of the returnees were from the Makwanpur District which is one of the prime trafficking areas in Nepal and also one of the poorest parts of the country.

Rehabilitation

The EBT offers education and a return to schooling for younger circus returnees and recognises the need to offer older

returnees training in sustainable skills that will provide them with the opportunity of long term employment which will benefit themselves, their families and the community as a whole.

This paper discusses the objectives and goals behind the mushroom cultivation pilot project as well as the process of establishing a training center, and the evaluation of the pilot project for future courses.

Mushroom Cultivation

The viability of mushroom farming

Figure 2. Map of Nepal

The Makwanpur District is located where the low lying Terai region of Nepal meets the start of the hill region. Many varieties of edible mushrooms are found in a wild state in the Terai lowlands, the hills and mountains of Nepal (Cozens, 2004). Through research it was learnt that the region was suitable climatically to grow mushrooms and especially the *Pleurotus* spp. (oyster mushroom) and *Volvariella* (paddy straw mushroom) which grow easily during most seasons (Cozens, 2004).

Mushroom cultivation in this part of Nepal is an economically viable skill because there is minimal input required due to the low cost of spawn and agricultural waste, and the activity generates a good financial return. Mushroom farming is not labour intensive and does not necessitate a large amount of land; it can be done in conjunction with other types of farming, such as goat herding or chicken farming increasing the amount of income generated. Mushrooms are a good source of protein, minerals and some vitamins. In order to supplement the diet of the farmers, who may not be able to afford nutritious meals for themselves and their families, they are able to eat a portion of the mushrooms grown.

The suitability of mushroom farming for the beneficiary group

There are over 150 circus returnees who have been identified, whose ages range from 6 to 42. Most of the returnees are female with only 11% being male and many have home commitments that mean they need to learn a skill they can use from home.

Mushroom cultivation is ideal for this group as they can transfer the skills learned to their homes where they will still be able to fulfil their other commitments. In the past the girls have suffered discrimination and harassment due to their history but as mushroom farmers, whose produce is sold they will become the main income earners in many of their families and they will gain the respect of others in society.

Objectives

The mushroom cultivation course aims to teach the returnees skills that will enable them to participate and be strong competitors in society. The skills are those that they can use in their own homes and villages and/or in a planned central production center through which they can become self-sufficient, financially independent, and contribute to relieving the financial hardship in their communities. In this way the returnees will regain the self-esteem and confidence that they lost through the harsh treatment in the circuses and since their return to Nepal.

Project Planning

Overview of the process

EBT and NCWF planned the course and project on a number of levels. Initially the EBT Director, Philip Holmes discussed mushroom farming with the staff at EBT and with the NCWF Director, Khem Thapa. Clare Murray of EBT researched mushroom farming by contacting organisations involved with mushroom farming and small business initiatives. She contacted MushWorld who forwarded details of mushroom experts in Nepal and sent the informative 'Mushroom Growers' Handbook 1: Oyster Mushroom Cultivation.'

It was necessary to ensure that an idea which was put forward in a meeting in an office in London, UK would be viable on the ground in Nepal and a skill that the circus returnees would want to take up. Therefore on a visit to Nepal, Clare Murray discussed and researched the idea with NCWF staff in both Hetauda and Bhairahawa and the circus returnees themselves. The staff in Hetauda assisted in the market research of the area, the number of the participants, where the training center would be established, which members of staff would be involved and the logistics of the course.

Table 1. Initial investigatory phase of the project planning

Detail	Remarks
Process: Negotiations	
1. Negotiations took place between EBT and NCWF to discuss whether mushroom farming was a viable option in Nepal and specifically in the Makwanpur District for the circus returnees. 2. Discussions with the circus returnees took place to ensure mushroom cultivations was a skill that they wanted to learn and one which would be suitable to their needs.	1. It was necessary for all partners concerned to discuss the project and reach a consensus on the next stage so that everyone involved had the opportunity to express concerns and convey ideas right from the beginning. 2. The requirements and opinions of the beneficiary group have to be the priority in all project planning to ensure the sustainability of the project.
Process: Research	
1. EBT carried out research of mushroom cultivation through the internet, reading publications and books. 2. EBT undertook research in Nepal talking to mushroom experts to ascertain the viability of mushroom cultivation in the Makwanpur district. 3. EBT researched the equipment needed to establish a training center and the cost involved. 4. EBT and NCWF carried out market research in Nepal and the Makwanpur district.	The project required research on all levels to ensure that all involved could be prepared before the courses started.
Process: Partners	
1. EBT and NCWF worked together from the initial stages of project planning. 2. MushWorld forwarded the contact details of a mushroom expert in Nepal called Dr. Manandhar. Initially she discussed the project idea with EBT and NCWF and offered her advice before becoming the trainer on the pilot course. 3. MushWorld provided advice throughout the planning of the project.	All partners involved in the project contributed their expertise to achieve a holistic approach to the project.
Process: Beneficiary group	
1. The background of the circus returnees was taken into account so that any emotional support they might need should be provided. 2. Any transferable skills that the project team could offer were used.	Underlying all the planning was the emphasis on sustainability of the project necessitating the provision of practical and emotional support for the beneficiary group.
Process: Feedback and monitoring	
1. Throughout the planning and implementation of the project the opportunity for the project team to comment and provide feedback was emphasised so that adjustments could be made. 2. Monitoring of the project was required so that modifications could be made to ensure success of future courses and the long term viability of the project.	1. The beneficiary group should be given the opportunity to provide feedback. It is understood that the beneficiary group's circumstances will change over time and modifications will be made where necessary. 2. Nepal's political situation is unstable and it was necessary to realise that if there was a deterioration of the situation, it might impede project implementation, necessitating flexibility in the project planning.

Market research and competition

EBT and NCWF established that initially the mushrooms would be sold to the local market in nearby towns such as Hetauda, Birganj (50km from Hetauda) and Chitwan (60km from Hetauda) and our research produced positive feedback from the local hotels and restaurants that due to the lack of fresh mushroom use canned mushrooms. They all said that they would be keen to buy fresh mushrooms from the returnees if they were available. They all emphasised the need for the mushrooms to be really fresh and this became one of the main concerns of the project since Hetauda, being on the edge of the low lying Terai, has a hot climate.

There are no other mushroom farms in the vicinity of Hetauda, so the Nawajagaran Cooperative, a cooperative which supports the return of circus girls and their rehabilitation, is in the enviable position of being able to produce mushrooms exclusively for the local market. It is commonly thought that mushrooms can only be grown in the winter in the Terai region of Nepal. While it is true that oyster mushrooms can only be grown from October to February in the Terai, shiitake mushrooms can be grown when the oyster mushrooms are not in season. There is thereby an almost year round production possibility.

Project team

We devised a team who would manage the training center and project and offer long term support to the participants. They included:

Trainer

Dr. Manandhar, as a trainer for the course, devised the syllabus and training schedule. She also appointed a trained assistant who assisted with the training alongside Dr. Manandhar or alone when Dr. Manandhar thought it was suitable.

Assistants

Two NCWF staff were assigned to assist with the course at the same time as learning how to grow mushrooms ensuring that skills and responsibilities were transferred through so that course and project could be replicated and sustained in the future. They could also provide any support needed by the circus returnees.

Figure 3. Dr. Keshari Manandhar giving a lecture at the opening ceremony

Monitoring

EBT and NCWF took on the role of monitoring the project to ensure that any feedback from the circus returnees or trainers was taken on board and any modifications implemented.

Transferable skills that EBT or NCWF staff had were utilized; for example, a member of NCWF staff had a commercial background and in the market research stage of the project he contacted connections from his previous employment.

The syllabus

Dr. Manandhar devised the syllabus which included:

- Pasteurization of substrate
- Harvesting of mushrooms
- Pest and disease management
- Financial management
- Inoculation of substrate and mycelium process
- Nutritional and medicinal values of mushrooms
- Post harvest management and drying methods
- Packaging, marketing and cooking

It was decided that initially spawn would be purchased since spawn cultivation is a more complicated process and requires more technical equipment. Spawn cultivation would be an advanced part of the course. The training center, however, will start to produce its own spawn eventually. The course syllabus was developed to be as well rounded as possible so that the participants might be trained in the financial management of the farm, understand the health benefits of mushrooms, and be able to market the produce and cook healthy meals for their families in addition to learning the skills of mushroom cultivation.

Table 2. Training schedule for circus returnees (Mushroom Cultivation Training Part I)

Day 1 **September 23, 2004**	Session I – Inauguration of the Training		by Dr. Keshari Manandhar
	10:30 - 11:00	Opening ceremony	Classroom
	11:00 - 11:30	Introduction of participants and others	Classroom
	11:30 - 12:30	Introduction of mushroom cultivation	Classroom
	12:30 - 12:45	Closing of the session I	Classroom
	12:45 - 13:30	Tea Break	
	Session II- Oyster Mushroom Cultivation		by Mr. Gokul Raut
	13:30 - 14:30	Method of oyster mushroom cultivation	Classroom
	14:30 - 15:00	Discussions	Classroom
	* Programme supervisor set up classroom for the whole training period. Snacks and tea were required. Mr. Indra Dahal arranged all necessary arrangements for the inauguration.		
Day 2 **September 24, 2004**	Session I - Practical Work		by Mr. Gokul Raut
	10:00 - 10:30	Chopping of straw and soaking in water	Mushroom Farm
	10:30 - 11:00	Theory on pasteurization of straws	Classroom
	Session II		by Mr. Gokul Raut
	11:00 - 11:30	Clean the straw and drain off water	Mushroom Farm
	11:30 - 12:00	Pest & disease management – theory only	Classroom
	12:00 - 12:30	Start pasteurization of straws	Mushroom Farm
	12:30 - 13:30	Pasteurization continues and tea break	Classroom
	Session III		by Mr. Gokul Raut
	13:30 - 14:00	Take out the substrate and cool it	Mushroom Farm
	14:00 - 14:30	Nutritional and medicinal value of mushroom	Classroom
	14:30 - 15:00	Spawning and make the packets – store them	Mushroom Farm
	* Group 1 - 20 Participants only. Snacks and tea were required		
Day 3 **September 25, 2004**	Session I		by Mr. Gokul Raut
	10:00 - 11:30	Chopping the straw and soak in water	Mushroom Farm
	11:30 - 12:30	Clean the straw and drain off water	Mushroom Farm
	Session II		by Mr. Gokul Raut
	12:30 - 13:30	Pasteurization of straw	Mushroom Farm
	13:30 - 14:00	Tea break	Classroom
	14:00 - 15:00	Spawning and making the packets	Mushroom Farm
	* Group 1 - 20 Participants only. Snacks and tea were required		
Day 4 **September 26, 2004**	Session I		by Mr. Gokul Raut
	10:00 - 10:30	Chopping the straw and soak in water	Mushroom Farm
	10:30 - 11:00	Theory on pasteurization of straws	Classroom
	Session II		by Mr. Gokul Raut
	11:00 - 11:30	Clean the straw and drain off water	Mushroom Farm
	11:30 - 12:00	Pest & disease management – theory only	Classroom
	12:00 - 12:30	Start pasteurization of straws	Mushroom Farm
	12:30 - 13:30	Pasteurization continues and tea break	

Day 5 **September 27, 2004**	Session I		by Mr. Gokul Raut
	10:00 – 11:30	Chopping the straw and soak in water	Mushroom Farm
	11:30 – 12:30	Clean the straw and drain off water	Mushroom Farm
	Session II		by Mr. Gokul Raut
	12:30 – 13:30	Pasteurization of straw	Mushroom Farm
	13:30 – 14:00	Tea break	Classroom
	14:00 – 15:00	Spawning and making the packets	Mushroom Farm
	* Group 2 – 20 Participants only. Snacks and Tea required.		

Table 3. Training schedule for circus returnees (Mushroom Cultivation Training Part II)

Day 1 **October 4, 2004**	Session I		by Mr. Gokul Raut
	10:00 – 10:30	Opening of plastic bags & watering on packets	Mushroom Farm
	10:30 – 11:00	Post-harvest management & drying methods	Mushroom Farm
	11:00 – 11:30	Packing, marketing and cooking	Mushroom Farm
	11:30 – 12:30	Practical work on opening the plastic bags	Mushroom Farm
	12:30 – 13:00	Tea break	Classroom
	* Snacks and tea were required		
Day 2 **October 5**	10:00 – 15:00	Preparation of straw packets	Mushroom Farm

Equipment & costs

Figure 4. Growing house under construction

Figure 5. Floor work for growing house

Figure 6. Two plastic tunnels

Figure 7. Preparation for bag filling

Thatched houses were built to grow mushrooms in (40 × 15 × 8ft). The thatched house was made from wheat straw, bamboo and wooden supports. Plastic tunnels were constructed of plastic sheets with bamboo supports. The plastic tunnel can also be covered with straw. Two tunnels were built by eight of the girls' fathers as they wanted to contribute in some way to a project that would benefit their families and communities on a long term basis.

Equipment includes straw chopper, plastic bucket for soaking, sieve for draining (a wooden framed net), steamers (clay pots or metallic drum), kerosene stove, plastic bags, grain spawn and sprayer for watering. The cost for a 3-month mushroom training course for 50 people is as shown in Table 4.

The price of mushrooms fluctuates but a fixed price all year round, approximately NPR[1]100, will be given to the cooperative by the business manager for their mushrooms so that they will have a steady income. Initially the farmers will need more help financially but as they grow more mushrooms and their farms become well established the fixed price can come down.

Once all costs had been ascertained EBT wrote a project proposal to MushWorld requesting funding. MushWorld agreed to this proposal and provided funding for the project in stages.

Table 4. Costs for a 3-month mushroom training course for 50 people

	Item	Quantity	Cost in GBP[2]
Core costs	Lease of land for training centre	2 months	8.00
	Construction of a mushroom growing house and storage of equipment	2	160.00
	Tuition fee for 3 months	50	1190.00
	Total for core costs		1,358.00 (USD2,613.05)
Equipment	Chopper	2	8.00
	Plastic bucket	4	5.00
	Framed net	2	8.80
	Metallic drum	2	16.00
	Kerosene stove	2	9.60
	Sprayer	2	48.00
	Punching machine	2	0.80
	Total for equipment		96.20 (USD185.11)
Raw Material	Paddy straw	1,000kg	24.00
	Plastic bags	8Kg	7.60
	Spawn	250 bottles	60.00
	Chemicals		8.00
	Plastic sheet	20 metres	8.00
	Fuel for steaming		12.80
	Notebooks	50	7.50
	Booklets	50	4.00
	Miscellaneous		5.00
	Total for raw materials		136.90 (USD263.42)
Grand total			1,591.10 (USD3,061.38)

[1] NPR (Nepalese Rupee, USD1 ·, NPR78.045 in March, 2005)
[2] GBP (Great Britain Pound, USD1 ·, GBP0.5197 in March, 2005)

Long term benefits

At the end of the courses, it was decided that all the participants would become members of the Nawajagaran Cooperative, which would entitle them to the equipment and a loan necessary to start producing mushrooms in their homes and villages, as well as the technical support that they might need in the future. It would provide an incentive for commitment to the project and farms. The cost of the establishment of the farms would be kept low by adapting equipment that many households already have for new use in mushroom farming. For example metal drums are used to make local alcohol but can also be used for the pasteurization of the substrate.

The girls have found much support from each other and have recognised the emotional benefits from working as a group. For those who prefer to farm as a group the association will maintain a farm at the training center. For those participants who live in very small houses, that are rented and without room for farming, they will farm from those members' houses which have room, or from the training center. The farm at the training center will be maintained even if there are not courses running at that time.

The cooperative will grow and harvest mushrooms at the farms before bringing the produce to the training center where we plan to offer processing facilities (drying and oil extraction) and where the business manager deals with the sale of the mushrooms. The money from the sales is divided between those who have produced mushrooms as well as paying back the loan for setting up the farm in the first place. The mushroom training center will become part of a farming center and will train girls in the production of a range of market garden produce.

The Pilot Course

The course

After discussions with the circus returnees it was established that 40 returnees were interested in mushroom cultivation and in order not to oversubscribe the course the group was split into two groups of 20. In this way two courses could run concurrently and this will happen in future so that a greater number of people can benefit from the training in a shorter time.

The pilot course ran part time over one month and covered the growth of oyster mushrooms. The course began in the classroom with the theory (Fig. 9) before moving onto the practical side where the participants were actively involved–learning through participation (Figs. 10). Mushrooms were grown and sold on the course and this will happen on future courses.

The staff at NCWF have been involved with the project from the beginning and having seen the success of the course and learnt the skills involved, and they have set up their own mushroom growing house at the Head Office in Bhairahawa and have produced a very healthy harvest.

Figure 8. Trainees of the pilot mushroom training course

Figure 9. Mixed participants consisting of parents, circus returnees and others in theory lesson

Comments from the course

The pilot mushroom training course started on 23rd September 2004 and the first stage of the course finished on 11th October when all participants were presented with a certificate. The course was a huge success and the reports throughout the course were very positive:

- From Dr. Manandhar after the first week - "The programme went very well. I am very happy with the girls. I am sure they will do well in mushroom cultivation."
- From Dr. Manandhar after the second week: "My assistant, Gokul Raut has come back from Hetauda. He has completed the practical work and the girls have prepared about 180 balls which are accommodated in the shed. We have to wait for three week to allow them to mature."
- From Captain Khem Thapa, Director of NCWF - "The first part of the training went well. According to the trainer, the crops looks really good and we should have pretty good harvest in two weeks time."
- From Philip Holmes, Director of EBT - "All is going well with the mushroom cultivation initiative having just seen its first harvest - and a bumper one it was too. The girls were given the first mushrooms for themselves but a second consignment was sold to a local hotel."

Figure 10. Hand-on class activities **A**: Chopping straw **B**: Soaking and cleaning of straw and draining off water **C**: Pasteurization of straw **D**: Bag filling **E**: Spawning **F**: Spawned substrate bag **G**: Hole making **H**: Spawn run **I**: Fruiting bodies

Conclusions and Recommendations

Conclusions

The pilot mushroom farming training course was monitored and evaluated throughout in order to understand the requirements for future courses. The conclusions from the successful completion of 40 circus returnees on the pilot course are discussed below.

The mushrooms have so far been sold to the local market but the potential of the nationwide market and exporting is understood. Lack of refrigeration and difficulty in transport due to the political situation in Nepal make supply to other areas of the country difficult. Therefore in the future some mushrooms will be dried using simple technology, and this will

Figure 11. The Esther Benjamins Trust and the Nepal Child Welfare Foundation working for the welfare of Nepalese children

open up the nationwide market and also the very valuable export market.

The costs for the pilot course were kept low, EBT and NCWF recognise the need to keep technology simple and ensure cost effectiveness to guarantee the sustainability of the project. It is felt, however, that some expansion is necessary in order to increase the economic success in the future and a processing center will be constructed.

Because the pilot course in mushroom farming was a success with good harvests, profitable sales and the circus returnees enthusiastic EBT and NCWF are looking at other produce that can be grown using the same approaches and techniques.

Recommendations

Roger Cozens (Greenacres Consultancy), an agricultural specialist, visited the project in November 2004 and offered his professional advice on the project. His recommendations were:

- To consider mushroom processing such as drying and canning which increases profitability of mushroom production by enabling mushrooms to be sold nationwide and overseas.
- To grow oyster and shiitake mushrooms as they are simpler to grow and do not need such sophisticated building work. But to also develop new varieties using sawdust substrate from the local sawmills.
- In order to increase production there is a need for a pasteurisation area, a spawn preparation and spawning room and a cropping room.
- To use the straw that is used as a substrate as a fertilizer for vegetables or chicken feed after mushroom production is complete.
- To trade the product 'ethically' since the one of the fastest growing sectors within the food market is high value products from organic and sustainably managed land.

Roger Cozens was most impressed by the standard of cultivation that he saw, especially in terms of control against contamination.

In conclusion, with the completion and evaluation of the pilot course and with the inclusion of the recommendations from Roger Cozens the mushroom farming training course will be replicated with adjustments so that circus returnees can successfully grow mushrooms and other produce on a long term scale benefiting themselves, their families and the local community. It is felt that mushroom farming and processing is a way of impacting upon many lives through sustainable means and by reducing the poverty in the Makwanpur district of Nepal it will also reduce the need for families to send their children away under illegal contracts to work in the circuses; helping to achieve EBT's aim to see the end of the use of child performers in circuses.

Table 5. Investigation phase categories and strategies

Participatory	• Use participatory methods in the analysis phase to seek the views of a range of stakeholders, including poor people, to ensure relevant information. • Negotiate on equal terms a process and principles for intervention with project partners. • Involve a range of stakeholders in implementation to strengthen ownership and thus improve sustainability.
People-centered	• Ensure that the needs and priorities of the poor are central and primary. • Take concerns of disadvantaged groups into account, e.g. women, minorities and children. • Involve stakeholders from different organisations, government, NGOs and communities, to ensure that poor people's livelihood perspectives are represented.
Partnerships	• Negotiate fundamental principles and values for working with partners in order to ensure a transparent and solid foundation for ongoing relationships. • Plan for capacity building and handing over responsibility for implementation to partners for long-term sustainability.
Holistic	• Look beyond single sector projects / programmes. • Involve agency staff and partners from different disciplines to broaden the range of perspectives. • Make linkages between different project / programme plans.
Dynamic	• Be aware that livelihoods change over time (seasonal and longer term). • Adopt a process approach, with effective feedback and monitoring procedures. • Accept that the project environment is likely to change over time. Establish a process for reviewing and re-negotiating project objectives and processes at stages during the life span of the intervention.
Building on strengths	• Do not analyze and plan around problems only, but also focus on strengths. • Use strengths, including good relationships, as a starting point for planning and build on them.
Macro-micro links	• Recognise the impact of policy and institutional context on livelihoods. • Make links between micro reality and macro level influences. • Involve stakeholder from a range of levels: from national to local, giving equal voice to all.
Sustainable	• Ensure activities are sustainable in long term (including economic, resource and social sustainability). • Keep exit strategies in mind, and ensure transfer of skills and responsibilities.

REFERENCES

• Cozens, Roger. 2004. *Report for the Esther Benjamins Trust and the Nepal Child Welfare Foundation*. 4pp.