

Chapter Seven

Pro-Women Technologies

Introduction

Although most mountain communities in the HKH region have in common their heavy dependence on subsistence agriculture and pastoralism (Sharma 1994), the social environment is largely variable and diversified. The magnitude of diversification is significantly determined by socio-religious elements along with bio-climatic factors. Within this diversified social environment, however, men commonly dominate the society. Historically, and in line with sociocultural norms, the human population was segregated on the basis of indoor and outdoor activities. Domestic household activities along with family care were assigned to the female segment, while work which involved outdoor mobility (i.e., cultivation, pastoralism, etc) was taken by the men. As farming operations expanded due to localised socioeconomic compulsions, the dominant segment also put women into outdoor work to meet increased labour demands. Under the influence of male heads of family, women accepted this additional role and could not deny them this support under invisible social barriers, but remained discredited in terms of economic empowerment (Figure 1).

Many publications focus on gender analysis and its equity (Nathan 1995; Zaidi

1996; Syed 1994; Sharma 1997), and several researchers have emphasised the need for appropriate farm technologies that reduce the workload of rural women and increase their income generation capability. Depending upon the individual's approach and his/her perception of gender issues, numerous appropriate technologies have been recommended in this regard (FAO and IIRR 1995; Capistrano et al. 1990; Anonymous 1995; Carr 1991; Prasad and Ram 1990). Figure 1 invites the reader to understand a conceptual process of workload increase with regard to traditional rural women. Most of the suggested woman-related technologies are promising, however, these suggestions require women to undertake outdoor activities in addition to their traditional household jobs. Their involvement as farm labourers with the heavier workload declines very little. It does not necessarily mean that women should not accept any productive role in developing the household economy in addition to their traditional jobs. When discussing this issue it is critical to understand the rebound phenomenon of labour displacement from agricultural fields (see Figure 2).

The Rebound Phenomenon

Sooner or later, agricultural fields will be mechanised, as is the case in developed

Figure 1: Conceptual Diagram of Historical Workload Segregation of Human Population in the HKH

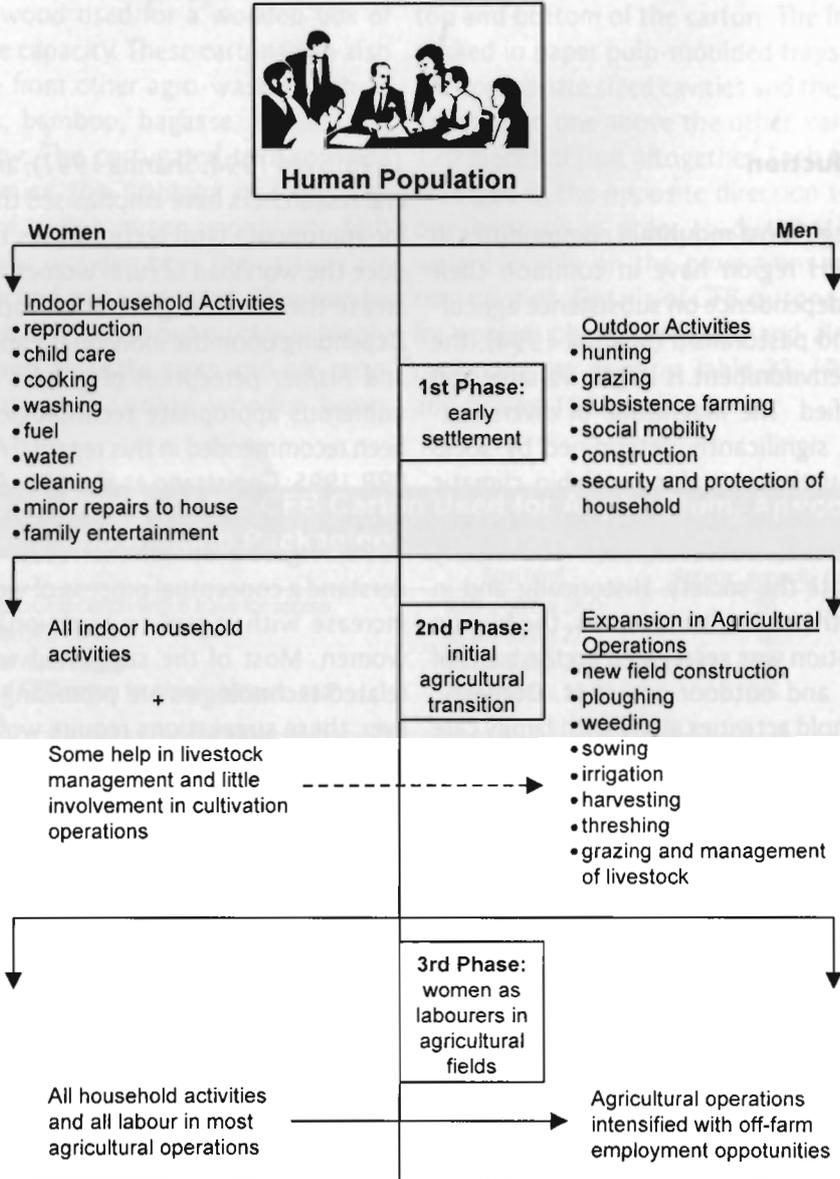


Figure 2: A Conceptual Rebound Phenomenon of Labour Displacement

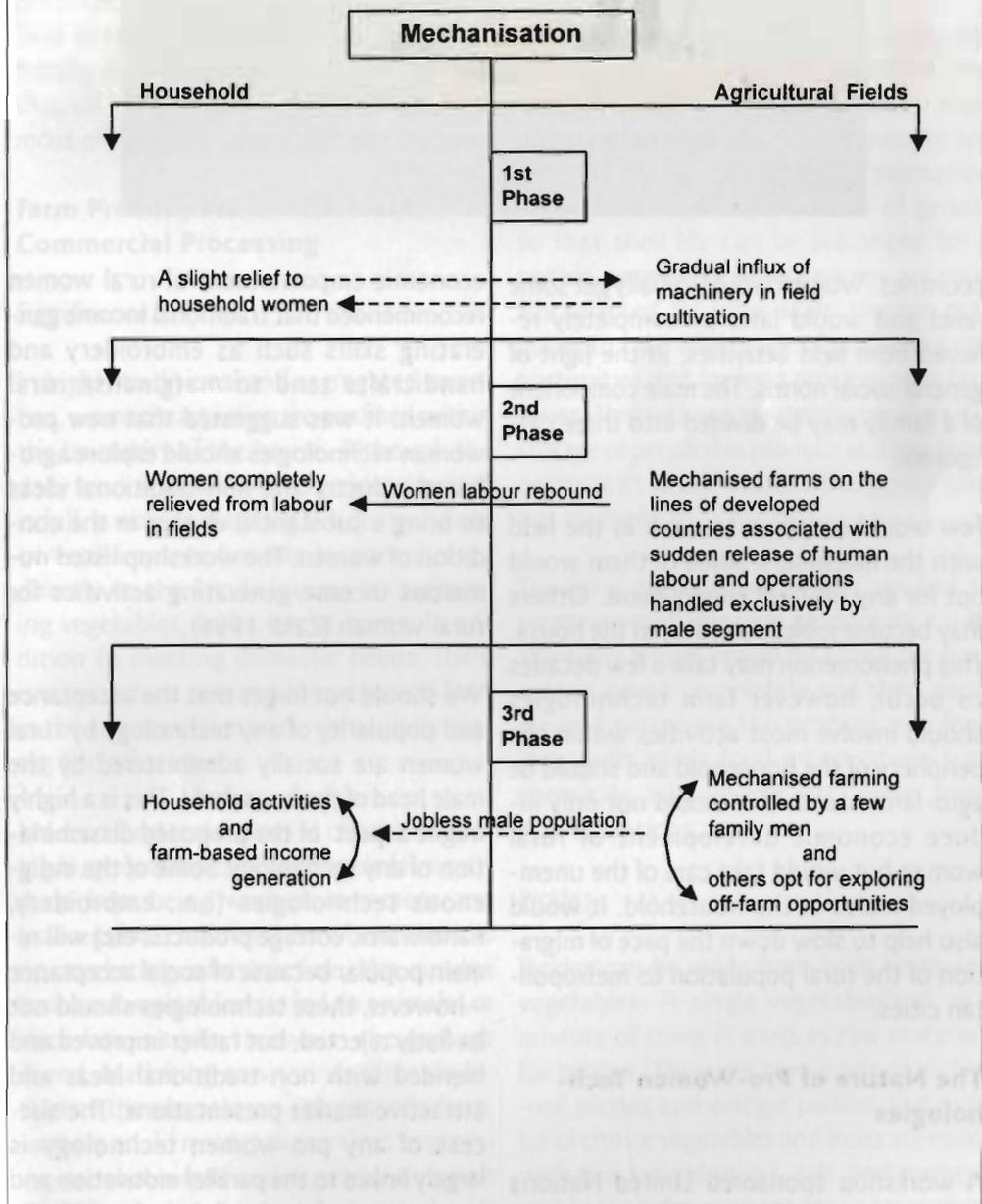


Plate 50: A Chinese Woman Threshing Wheat Grains



countries. Women would initially get some relief and would later be completely relieved from field activities, in the light of general social norms. The male component of a family may be divided into three categories.

Few would continue to work in the field with the machinery. Some of them would opt for any off-farm employment. Others may become jobless and stay in the house. This phenomenon may take a few decades to occur, however farm technologies should involve most activities within the periphery of the household and should be agro-farm based. This would not only induce economic development of rural woman but would take care of the unemployed males in the household. It would also help to slow down the pace of migration of the rural population to metropolitan cities.

The Nature of Pro-Women Technologies

A workshop sponsored United Nations Development Programme (UNDP) on the

economic empowerment of rural women recommended that traditional income generating skills such as embroidery and handicrafts tend to marginalise rural women. It was suggested that new pro-woman technologies should explore agro-based industry and non-traditional ideas to bring a substantial change in the condition of women. The workshop listed numerous income-generating activities for rural woman (Zaidi 1996).

We should not forget that the acceptance and popularity of any technology by rural women are socially administered by the male head of the household. This is a highly fragile aspect of the proposed dissemination of any technology. Some of the indigenous technologies (i.e., embroidery, handicrafts, cottage products, etc) will remain popular because of social acceptance – however, these technologies should not be flatly rejected, but rather improved and blended with non-traditional ideas and attractive market presentations. The success of any pro-women technology is largely linked to the parallel motivation and involvement of the family's males with the

technology itself and their involvement throughout the process. All technology promoters might first focus on the male segment for the social acceptance of the new and highly productive role of rural women. Men may realise that they have to share the household's workload while women are working on economic activity out of doors. This would also make most other technologies that involve women in field operations more effective. While selecting pro-women technologies for this chapter, we have attempted to consider most of the implications discussed above.

Farm Produce Preservation and Commercial Processing

Significance

In highly traditional and segregated societies, women's activities are confined within the boundary of the house. Although the daily work schedule of this gender segment is full, a woman working inside the house can still improve her role by contributing directly to the family income by preserving vegetables, fruits, etc at home. In addition to meeting domestic needs, there is a persistent demand for preserved food in the commercial market, particularly during the off season.

Modern food technology is capable of saving huge quantities of perishable farm produce from being wasted. In remote and inaccessible communities where there is no marketing infrastructure, the surplus fruit and vegetables are fed to animals, or their fate is to be thrown in the garbage dump. Marketing constraints strongly influence the annual crop calendar of a farm. Farmers could restrict themselves to growing perishable fruit and vegetable crops on a smaller scale.

The preserved farm produce (i.e., vegetables and fruit) provides highly nutritious food throughout the year and during the off-season. The influx of skilfully preserved food items may be used effectively to control seasonal fluctuations in the market price of various vegetables and fruits.

Components

There are two methods of preserving vegetables and fruits (i.e., short duration and long duration). The short duration food preservation techniques are generally applied in order to prevent the fermentation process and the multiplication of germs, so that shelf life can be prolonged for a certain period. These procedures are usually adapted for large-scale storage purposes to take advantage of marketing opportunities and for food processing in factories. This technology mostly involves the storage of perishable produce at a low temperature at which most of the germs cannot multiply.

The long duration method is applied to preserve perishable farm produce for a substantially longer period by killing the hazardous germs completely and then packing and preserving the produce as a food item with edible food preservatives (i.e., chemicals, oils, vinegar, etc) under hygienic conditions.

Pickles

Pickles can be made from both fruits and vegetables. A single vegetable/fruit or a mixture of them is used as raw materials for pickles. There are two kinds of pickles – oil pickles and vinegar pickles. Cut pickles of choice vegetables and fruits are mixed with the desired spices, salt, and turmeric and kept under sunlight for at least three

days and are later preserved in a sufficient volume of mustard oil or vinegar. The upper level of oil/vinegar should always be about two inches above the raw material content. The spices are added to give a certain taste. Turmeric is an important component of an oil pickle, because it serves as a germicide as well as giving a good colour to a pickle. The processed product is stored in ceramic pots at room temperature. A delicious pickle is ready within from five to seven days and may be stored for years.

A few recipes are as follow.

i. Mango pickle

Ingredients

mangoes	2kg
mustard oil	1kg
green chillies	120g
turmeric powder	4 tblsp
peeled and sliced ginger	125g
peeled garlic flakes	120g
chilli powder	200g
coriander and cumin seeds	6 tblsp
salt	1/2 cup
vinegar	1/2 cup
aniseeds and fenugreek	1/2 cup

Seasoning: Two tblsp *saunf* and mustard seeds (rye) fenugreek (*methi*), two tblsp whole pepper corns.

Cut the mangoes into four pieces. Remove the white seeds then wash and drain. Mix two cups of salt, turmeric powder, coriander, *methi* and aniseed. Keep in a jar for three days. Drain pieces and throw away the water. Dry pieces in sunlight for a few hours.

Heat the oil and cool and then add the masala powder (i.e., all spices). Pour this mixture over the mangoes. Add vinegar.

Make a saturated solution of salt in water. Cool and add to mangoes. Oil should stand 5cm above the level of the mangoes.

This pickle can be kept for an indefinite period.

ii. Tender mango pickle

Ingredients

tender green mangoes	1 kg
mustard	2 tblsp
chilli powder	4 tblsp
oil	2 tblsp
cumin seed	2 tblsp
sugar or jaggery	1 tblsp

Rinse and dry mangoes. Cut the peeled mangoes into small pieces. Remove white seed. Heat oil, fry cumin and mustard seeds and add the mango pieces. Stir well. Add chilli powder, salt, and cook. Then add a cup of water and cook till the gravy is thick. Stir in sugar or jaggery. Cool and serve.

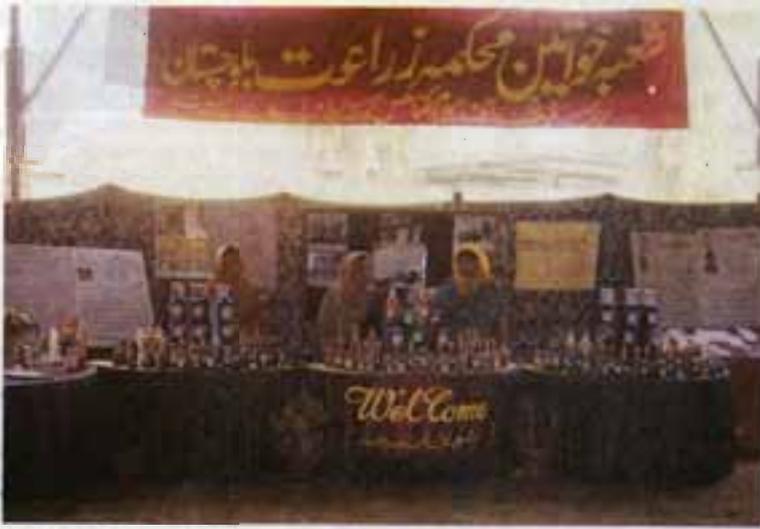
iii. Tamarind pickle

Ingredients

ripe tamarind	1 kg
grated jaggery	500g
fenugreek (<i>methi</i>)	
and aniseeds	2 tblsp
chilli powder and salt to taste	4 tblsp

Remove the brown skin of the tamarind and break it into pieces. Pound together all the spices coarsely, mix them with salt and chilli powder and add to the tamarind. Put one cup of water into the jaggery and prepare a one-thread consistency. Put in tamarind, mix well and cook for ten minutes. Remove from heat and, once cool, put into jars. Sun dry for two days.

Plate 51: Pickles, Jams, Chutneys Processed by Women on a Commercial Scale



Training of this gender segment in food preservation and processing techniques should be high priority for those who disseminate pro-women technologies.

iv. Mixed vegetable pickle

Ingredients

cauliflower	350g
each of potatoes, peas and thin papadies	250g
garlic cloves (peeled)	250g
ginger (sliced)	30g
salt	2 tblsp
vinegar	2 cups

Seasoning: 1 tblsp fenugreek (*methi*) seeds, 1 teaspoon mustard, 1/2kg oil.

Rinse and dry the vegetables. Cut vegetables into small pieces. Grind the spices into a fine powder. Heat oil, fry mustard and fenugreek seeds until spattered, then add and fry garlic, ginger and let it simmer. Add the ground spices, fry and stir well until brown. Add cut vegetables and cook for 4 to 5 minutes. Add vinegar, salt and boil until oil separates. Remove from heat, once cool, pour into a clean, dry jar.

Chutneys

i. Tomato chutney

Ingredients

tomatoes	250g
ginger	1 tblsp
raisins	125g
sugar	1/2 tsp
cumin seeds	1/2 tsp
garlic juice	1 tblsp
almonds	8
chillies	1/2 tsp
cardamom (powdered)	100g
vinegar and salt	to taste

Boil water and add tomatoes to the boiling water for peeling. Mash them well. Add onions, ginger, garlic and chillies. Cook by stirring these occasionally until all the ingredients are well mixed and tender. Once the mixture is a little thick, add vinegar and other ingredients. Almonds and raisins should be blanched and sliced before

being added to the tomato mixture. Cool for about 7 to 10 minutes, preserve in a jar. The chutney should be stored in a cool place.

ii. Plum chutney

Ingredients

fresh plums and tamarind	as desired
salt	6 to 8g
red chilli powder	6 to 8g
sugar	1 kg
vinegar	4g
cumin seeds, clove, cinnamon, caraway seeds	11g

Wash and clean plums and tamarind. Add water in sufficient volume so that its level is about 5cm above the plums. Add sugar and cook on a slow heat until plums and tamarind turn soft. Put remaining ingredients in a muslin bag and tie it, this is called pith. Put this bag of pith in the plum mixture and cook until thickened. Add salt and cook. Remove the bag of pith and cook until thickened. Add vinegar. Remove heat and pour into hot, sterilised jars.

Jams, Murabba, Jellies and Marmalades

Jams and jellies are mostly prepared by utilising low grade but healthy fruits such as apple, mango, citrus fruits, etc. These are all prepared in a similar way, however, the examples given below have mostly incorporated mango fruit.

i. Green mango jam

Pare and cut green mangoes into pieces. Add enough water to just cover it and cook on a slow heat until mangoes turn soft. Mash and pass through a big hollow sieve

and measure the quantity of pulp. If it is one cup, add two cups of sugar and 1/4 tsp citric acid. Mix well and boil the mixture until it reaches a jam consistency. Cool to room temperature, put in a sterilised bottle and cork.

ii. Ripe mango jam

Take fully ripe mangoes. Pare and cut them into pieces. Reduce them to a pulp. Measure the pulp. If it is cup, take one cup of sugar and 1/4 tsp citric acid. Mix well. Boil until the pulp settles in the water clearly. Simmer until a jam consistency is reached. Cool, put in a sterilised bottle and cork.

iii. Raspberry jam

Remove seeds and measure the de-seeded berries. For every one cup of berries, add 3/4 cups of sugar and simmer until it reaches a jam consistency. Cool, put in a sterilised bottle and cork.

iv. Carrot murabba

Ingredients

bright red carrots	250g
sugar	250g
cardamom seeds	1 tblsp
citric acid	1/4 tsp
essence of saffron and silver or gold paper	

Scrape carrots and cut into thick slices length-wise, then pierce all over with a sharp needle. Boil in water until they become almost tender. Drain completely and spread on a cloth to dry for a couple of hours. Prepare a light syrup with sugar and 1/4 litre water. Put in carrots and cook on a slow heat until the syrup turns thick. Stir in essence, cardamoms and citric acid.

Cool and bottle. Mix in pieces of foil. Lasts for two weeks.

v. Mango murabba

Ingredients

rajapuri mangoes	6 large
sugar	1/2 kg
cardamom seeds	2 tblsp
citric acid	1/4 tsp
essence of saffron	
<i>pan-ka-chuna</i>	1 tsp

Mangoes should be firm and not soft. Cut the peeled mangoes into fairly thick slices. Take a large vessel full of water and boil, then cool, and add 1 tsp of *pan-ka-chuna*. Stir it well and soak the mangoes overnight. Next day, drain the mangoes into a colander and let them remain there for a few hours to drain off water.

It is preferable to use a tinned copper or enamel pan for making this murabba. Put sugar in a pan, add four to six cups of water, it should just cover the sugar (do not add too much water) then keep it on the heat, stirring until the sugar is melted. If the syrup is too thick, add a little more water. Strain the syrup through a fine muslin cloth and wash the pan in which the syrup was made. Then pour the syrup into it. Add the well-drained mangoes and put on the heat. Bring it to a fast boil, then lower the heat and let it simmer for about 2 hours, or until the syrup is fairly thick, about the consistency of honey. Then add citric acid. Do not make it very thick or it will be sticky. The colour of the syrup should be a nice, reddish brown. Do not stir mangoes too often. Try to push the mangoes at the side over to the centre when it is ready. Sprinkle the pounded mixture of nutmeg and cardamom. Remove

from heat, cover with a clean cloth and leave it overnight. Next day, stir well and bottle. This preserve will remain good for over two years. Vegetarians can add a little milk to the syrup.

vi. Mango marmalade

Ingredients

pulp of huge green mangoes (crossbred variety)	1 cup
white sugar	2 cup

Pare and cut huge green mangoes. For 1 cup of mango pulp, add 2 cups sugar and boil on a slow heat. Keep removing scum that forms while boiling. When it thickens to a marmalade consistency, cool at room temperature, put in a bottle and cork.

vii. Orange marmalade

Ingredients

oranges	1 kg
sugar	1 kg
lemons	2

Peel oranges and remove pith, the inner skin, etc and take the pulp. Shred half of the total peel and boil it in water and strain. Repeat this three times then add the peel to the pulp and boil with sugar. When it is ready, add lemon juice and cool.

viii. Orange marmalade

Peel and extract the juice of a few oranges. Strain and measure the juice. If it measures two cups, take two cups of sugar and boil both together until a thick syrup is formed. Keep removing the scum that will be formed on the surface. Cool to room temperature and bottle.

Soak orange peel in salt water for two days. Drain and boil in fresh water until the peel becomes tender. Drain and put them in cold water and scrape the white pith from the inside of the peel. Wipe and cut them into thin, short slices. Measure peel and take an equal quantity of sugar and water and boil until a thick syrup is formed. Add the bottled syrup prepared two days earlier and simmer until a marmalade consistency is obtained.

Ketchup and sauces

i. Tomato Ketchup

Ingredients

tomatoes	5kg
ground onions	2g
garlic	60g
cloves	2g
cinnamon	2g
garam masala	6g
red chillies	4g
sugar	500g
salt	60g
vinegar	200mg

Take healthy tomatoes, wash and cut them into small pieces. Boil in water until softened. Strain the mixture through a fine muslin cloth. This tomato syrup must be 5kg. Tie all other ingredients in a muslin cloth and put it in the syrup and boil on low heat. Add one cup of sugar when the syrup is fairly thick. Remove the pith bag of spices and add remaining sugar and vinegar. Cook it for approximately 50 minutes or until the syrup is reasonably thick. Mix in Sodium Benzoate (½ gram) and store in a sterilised jar.

ii. Tomato sauce

Ingredients

tomato pulp	4kg
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sugar	1kg
ginger	120g
garlic	120g
salt	4g
vinegar	1ltr
red chilli	120g

Boil the tomato pulp. Strain the mixture through a fine muslin cloth. Add half of the salt and half of the vinegar and boil it for making tomato syrup. Prepare a syrup of the remaining vinegar, sugar, salt and all the other spices by boiling in water. After 15 minutes, mix this syrup with the tomato syrup. Boil it for two hours or until the syrup is fairly thick, strain the syrup through a fine muslin cloth. Store in sterilised bottles stopped with a cork.

Squashes and syrups

i. Lemon squash

Ingredients

lemon juice	6 cups
sugar	6 cups
water	12 cups
potassium meta bisulphite	1 tsp

Take lemon juice, sugar and water, and mix until all the sugar is dissolved. Then take one cup of hot water, dissolve one tsp potassium meta bisulphite in it, add it to the juice mixture and stir. Put in an airtight bottle.

ii. Rose syrups

Ingredients

rose petals	1kg
sugar	6kg
water	8kg
sulphuric acid	10 drops

Boil rose petals on low heat until mixed with water. Strain the water through a fine muslin cloth, then pour the sugar into the rose water and put it on the heat. Bring to a fast boil, then lower the heat and let it simmer for about an hour, or until the syrup is fairly thick, about the consistency of honey. Do not make it very thick, as it will be sticky. Mix sulphuric acid and essence and put in an airtight bottle.

Vinegar

Ingredients

- | | |
|-------------|--------|
| grapes | 5kg |
| salt | 1/2 kg |
| water | |
| ceramic pot | |

Clean and wash the grapes. Put salt, water and grapes in the ceramic pot. Close the opening of the pot with a cloth. Keep this ceramic pot in a dark and cool place for 40 days. After 40 days, strain the vin-

egar through a fine muslin cloth. Put in a bottle.

Mushroom Production

Significance

The history of the mushroom is as old as the history of mankind. In different civilisations, it is used as both food and medicine. In the mountains, wild mushrooms can be found in hilly and plain areas during the spring and mushrooms are used as a daily food. Poor farmers collect wild edible mushrooms during the mushroom season and sell them in the towns and cities. Nomads dry mushrooms under sunlight and store them for their future food needs.

Mushrooms are very high in protein content (i.e., 30%). They are low in starches and lipids and are therefore recommended as the best food for diabetic and heart patients. Commercial mushroom production

Plate 52: Commercial Production of Mushrooms on a Farm



This technology has tremendous potential for income generation. The scope is widened by its role in improving the protein component of the daily domestic diet

is popular in Europe and America. The technology is simple and low cost. Compared to other crops, the mushroom crop is less labour intensive, of short duration, and has the potential for substantial income generation.

A great variety of cheap and farm-based materials (e.g., agricultural wastes and household wastes) can be used successfully as a growing medium for various edible mushrooms. Mushroom growing requires little space and possesses great potential for landless and marginalised households. Mushroom cultivation remains an indoor activity.

Components

There are different kinds of mushroom, however, the mushroom section of the Agriculture Department, Balochistan, recommends the Oyster and Button varieties for mountainous regions.

Mushroom production needs some special treatments such as the preparation of artificial composite, pasteurisation of composite, preparation of beds, and spawning. Indoor mushroom cropping is becoming quite popular. Mushrooms are cultivated on compost in a suitable room. Horse dung is a traditional compost, however, modern research has developed methods to cultivate this crop vigorously on artificial composts of different compositions. The following is the simplest method of preparing artificial compost. Wheat straw is moistened in boiled water for 12 to 18 hours. This helps to kill all the germs in the straw. The straw is then spread over a floor or a plastic sheet to drain the surplus water. Spawn is added to it @ 100g of spawn per kg of dry wheat straw and is thoroughly mixed. The packing of this straw into polythene

bags follows (with each bag weighing roughly 1kg to 2kg). These bags are placed on steel or wooden frames within the room. Meanwhile, the room temperature should be maintained at 25 to 28°C for eight to 10 days. Afterwards, the temperature may range between 5 and 18°C. The optimum humidity levels should be 85 to 90 per cent. The room should be well ventilated. Under these conditions, a mushroom harvest may be obtained within four weeks.

Palm Leaf Household Products

Significance

Palms (*Nannorrhops ritchieana*) grow naturally all over northern Balochistan and in most other part of the HKH region. Certain gypsy tribes make their living exclusively by making and selling palm leaf products. Over the years, the gypsies have adopted it as a profession and it is now emerging as an industry. Most of the time, all family members specialise in making palm products – however, women are the key workers. Gypsies usually stay near to towns and cities. The male family members procure palm leaves from major production areas and transport them in truckloads to the places where their families are temporarily based. They are also responsible for marketing the products. Females and children work individually and in groups to make a variety of household products.

Components

Palm leaves are cut and air dried in the fields. Later, the dry leaves are transported to big towns or cities. Gypsy workers use these leaves for making household items such as brooms, baskets, caps, hats, *chitai* (used for the roofs of huts and other do-

Plate 53: Women are Key Workers in Making Palm Leaf Household Products



The making of palm leaf household products is gaining the status of an industry. As a species, the palm is experiencing intense and frequent cutting. The sustainability of this industry is linked to proper conservation measures and future propagation plans, along with good harvest management.

mestic purposes), decorative items, etc. Workers design the products in varied and beautiful colours, which add to their aesthetic attraction. Fresh leaves are used for making shoes.

Cottage Products

Significance

The HKH region experiences severe winters and as such, there is a big demand for wool and woollen products. The small-scale cottage industry has found an important economic opportunity in the area. Most households such as those of the *Çaddi* in HP, India, have installed indigenous handlooms and produce different woollen products. In the Ladakh area, goat and yak hair are especially used for making warm clothing for shepherds.

The majority of the sheep population in these mountains produce carpet type

wool. Wool fibres are coarse and the quality is low, which restricts its consumption by the woollen textile mills. The carpet industry is also not locally operative and local wool must travel to major cities for carpet production. The existing marketing intermediaries offer very low prices for wool clippings. Marketing opportunities for goat hair are equally bleak. Farmers prefer to use the hair for domestic needs rather than selling it at a nominal price.

Marketing as well as socioeconomic constraints direct livestock producers to maximise their domestic use of wool and hair. Previously, they used to make wool/hair cottage products for daily usage in the household. In time, the trend changed and farmers now market their cottage products, although they are still being exploited by market elements. Smart and well-informed marketing agents will purchase these products at cheap rates and will sell them to tour-

Plate 54: A Hand Loom Used to Make Woollen Cottage Products



The socioeconomic profile of gender on this aspect may be assessed to make it an income generating activity. Modern spinning and knitting equipment are required to meet this objective. Training programmes in modern designing coupled with intelligent marketing would make a positive difference.

ists as handicraft items with a very high profit margin.

Women are the actual workers who produce these cottage products at home.

Components

Shearing and clipping are generally done by the male members of the family. However, the processing involves women who produce a variety of wool and hair products. These products include grain storage bags, gypsy huts, transportation sacks used on horse and camel backs; ropes made mainly of goat hair; as well as rugs, mats, shawls, blankets, etc. made from wool fibre.

Women spin wool/hair using traditional and rustic equipment. They may use traditional dyes to produce different colours and dye mainly wool fibre. Very simple and inherited techniques are used to prepare hand-made products. The whole assembly includes a few wooden poles and ancient knitting equipment (i.e., a handloom) to produce a mat of a certain given length and width. One or more mats are then stitched to make a variety of cottage products.

This process is time consuming and involves many women hours to finish a cottage product.

Afghan refugees in Balochistan have given a new dimension to the local cottage industry. In refugee camps, the Afghan women are producing cottage products to improve their family income. Very interestingly, they use synthetic fibre obtained from used sweaters etc. Imported, used, warm clothing is available in local markets and is a sustainable and relatively cheap source of synthetic fibre for this industry. By producing attractive colours and a beautiful pattern, the Afghan women are successfully creating a market for their cottage products.

Rubber Water Containers

Significance

Water scarcity hinders not only agricultural operations, but equally affects the normal day to day life of the human population in the mountains. The problem is particularly visible in arid and cold tracts. Most of the time, local inhabitants travel long distances to transport water for their daily domestic use and to water animals. Women are mostly responsible for collect-

ing water for domestic use. Traditionally, water is transported on donkeys and camels in most of the western mountains of the HKH region. Goat skins are popularly used for transporting water and for storing water at home.

Rubber water containers (RWC) have emerged as a popular drudgery reducing utensil for women. Water is now mostly transported on animals in these containers of varying sizes and is stored at home. They have completely replaced goat skin containers due to their many advantages. They are seen everywhere in Balochistan.

Components

RWCs are roughly oval, barrel-shaped, with both ends round, and vertically flat. They are available in the market in many sizes (range of capacities). They are made of the used tyres of heavy duty vehicles and are therefore cheap. They are designed in such a way that one can conveniently

carry at least two containers on an animal. They are equally convenient for a human to carry on the back. The cost of an RWC ranges from Rs 200 to 250 (i.e., US\$5.0 to US\$6.25). Farmers can easily use them for more or less five years. They can keep water fresh for many days.

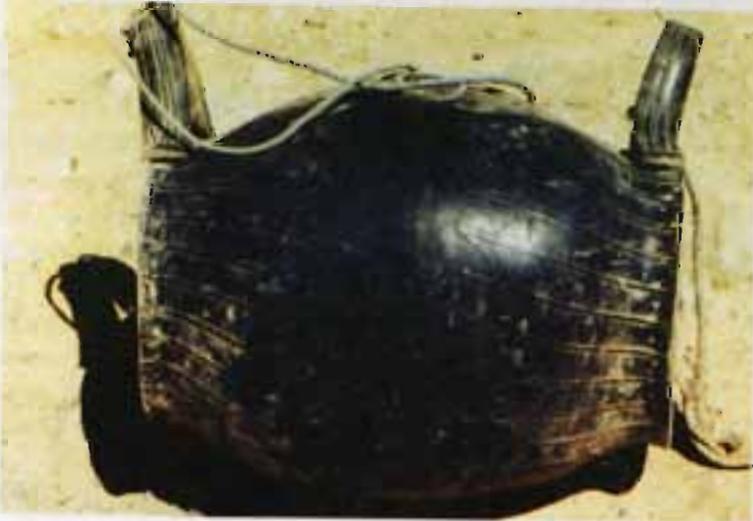
Beekeeping

Significance

The HKH region is a focal point in the origin and evolution of honeybees. Modern intensive agriculture with its diversified cropping patterns and orchards is becoming increasingly popular in the mountain ecosystem. The current agricultural transformation, once linked to apicultural operations, offers much scope for income generation through beekeeping.

Beekeeping also increases production of fruit and vegetables, particularly cross-pollinated crops such as apples, pears, plums,

Plate 55: Rubber Water Container in Balochistan, Pakistan



The RWC is environmentally friendly, because it consumes used and old tyres which otherwise are burned, producing a lot of smoke. Other items of domestic and daily use made of used tyres are also now available in the market. They are cheaper than the same type products in metal.

and litchis and seed production for cabbages, cauliflowers, carrots, turnips, radishes, and other vegetables (Azad 1993).

Traditionally, mountain women are rarely involved in beekeeping, perhaps due to ignorance. Beekeeping requires light labour, no permanent infrastructure and exploits orchard flowers beneficially for extra income generation. Apicultural operations can easily be undertaken by women of mountain households without any extra drudgery.

Components

Farm women can be trained successfully within a week in beekeeping operations such as hiving bees, bee swarms, occasional feeding, division of colonies by mass rearing of queens, uniting the colonies, queen introduction, prevention of ab-

sconding, swarm control, and honey extraction (Pandey and Pareek 1990). A household can keep as many boxes as can be conveniently managed by its women. An apiary with 10 bee colonies would cost less than US\$ 150 as an initial investment in most HKH countries. Peak average production in the second year would annually be 20kg of honey per colony with an additional five kg of beeswax. The initial investment would easily be recovered during the year following the establishment of the bee colonies (Saxena and Dhruvanarayana 1990).

There are four main species of honeybee found in the HKH mountains, i.e., *Apis cerana*, *A. mellifera*, *A. dorsata*, and *A. flora*. *A. mellifera*, a European species, is becoming very popular and is replacing the native species, *A. Cerana*.