

FUTUREGENERATIONS/CHINA

To Research, To Demonstrate, To Teach- How Communities Changes

PENDEBA MANUAL



ECO-TOURISM & INCOME GENERATION,
ENVIRONMENT & CONSERVATION,
SUSTIANABLE FOREST MANAGEMENT & TREE PLANTATION,
AGRICULTURE & KITCHEN GARDENNING

TRAINING MANUAL DEVELOPED BY:

Nawang Singh Gurung

Development Director, TAR, CHINA

TRANSLATE TO TIBETAN BY:

Tsering Norbu,

Development Expert, TAR, CHINA

SUPPORT BY:

1. Frances Fremont-Smith, Country Director Future Generations/CHINA
2. Dr. Daniel Taylor, President of Future Generations international
3. Future Generations staff and experts.

CONTENT

- 1. PURPOSE OF MANUAL.**
- 2. RATIONALE OF THE TRAINING MANUAL DEVELOPMENT**
- 3. EXPECTED OUTCOME LEARNING AND USING THIS MANUAL.**
- 4. ECO-TOURISM INCOME GENERATION.**
- 5. ENVIRONMENT CONSERVATION.**
- 6. SUSTIANABLE FOREST MANAGEMENT AND TREE
PLANTATION.**
- 7. AGRICULTURE AND KITCHEN GARDENNING.**

PENDEBA TRAINING MANUAL TWO

1. PURPOSE OF MANUAL.

This manual is to **help** Pendebas, mothers and communities to learn about the basic knowledge of an environment conservation, ecotourism income generation, sustainable forest management, tree plantation, agriculture and kitchen gardening as they practices in and help their communities. This manual can help Pendebas to learn basic concept of above subjects and simple ideas needed for the farmers and Nomad.

This manual has developed **with sources** of international experience organizations and professional experts who worked community based development. *References and sources of the manual is listed end of the manual.* I appreciate all organizations and personals who allowed us use their resources and given support to develop this manual.

2. RATIONALE OF THE TRAINING MANUAL DEVELOPMENT.

Past learning, all participants expected some reading materials during or after the training which help Pendebas for self learning through the reading materials. Pendebas can follow the experiential learning cycle using the reading materials “manual” so that Pendebas can effectively internalize learning practical. Pendebas train as multi-purpose workers has acquired an important role in learning, practices, demonstrate and teaching villagers. In every community of people are protecting the environment. But who knows about the successes that the people have already achieved? This manual:

- Helps people identify the successes they have
- Teaches people about successes that have happened in other communities
- Shows a process by which to improve local successes and to learn from other successes.

3. EXPECTED OUTCOME USING THIS MANUAL:

- Pendeba understand value of the natural resources, environment and able to teach their community.
- Community will have ideas how to balance to use local resources.
- Community will have changed their behavior thinking on the success, priority and solution of their development.
- Village people will protect extremely vulnerable forests and wildlife
- Ecotourism and income generation projects will be promoted to reduce poverty and protect the natural resources.

CHAPTER ONE: ECO-TOURISM INCOME GENERATION.

1. OBJECTIVE.

- By the end of session, participants will understand meaning, value and strategy of the ecotourism, environment sanitation, income generation and sustainability of the Pendeba program's Scale Squired Centers.



2. INTRODUCTION:

This session will guide the economic development, social development and environmental conservation aspect of the ideas.

1. Economic development idea will promote the expansion of income generation opportunities for the local people through ecotourism and a system of family hotels, traditional handicraft, local transportation and local available resources.
2. Social development will promote family health, Agro-forest, sanitation, through a community-based system known as Pendeba program—which links to the growing network of social services that is being provided by government and other NGOs.
3. The Pendeba program system is the key link that allows village people management environment conservation, creates empowerment and their true partnership with government rather than dependent to the outsider NGOs.
4. At present the major economic development of the area is agriculture and animal husbandry but there is major growth opportunity in ecotourism in Tibet. The local people and



government has taken the initiative of protecting the environment and creating the income generation for the local people. The Tibet Autonomous Region (TAR) is one of most famous, success and great strength to attract the world tourist.

- Important consideration is the highest mountain in the world Qomolangma,
- Biggest and deepest gorge *Rivers in* Nyingchi and Chamdo.
- The highest elevation on earth where forests are found.
- For the region visitors, Mount Kailas, Milareba, Potala place etc.
- The tourism potential in the Tibet comes from four groups of tourists.



1. The largest group who wish to make a quick visit; they will drive into the preserve, spend 3-5 days, and drive out. In time the majority of such visitors are likely to be people from inland China and the international tourist visitors.

2. The second group of visitors is people who want to have an adventure; this is an ecotourism industry that has been very successfully developed in Nepal and is called trekking. A trekking industry will likely give more jobs to local people as it can distribute visitors through a larger part of the Tibet not just Lhasa or along the roadways. Each single visitor in this group will also



likely stay longer so their contribution will be greater. Trekking through QNNP area such as

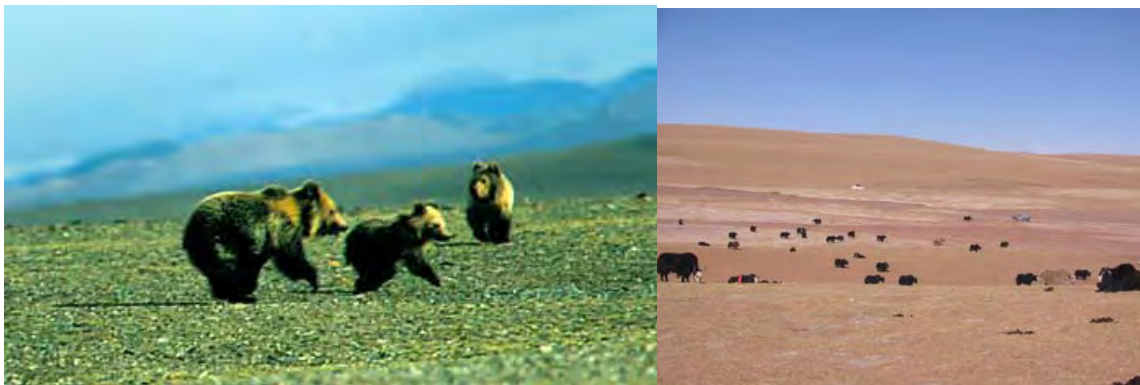


Kyirong; Shishapangma Base Camp out of Nyalam; Rongshar Yeti Pilgrimage, Rongpo Trek, Gama Valley, to the Bottom of Everest from Tingkya; PekuTso Lake; Chamdo area Riwoche Deer farm, Markham hot spring, Basu lake and Nyingchi Pasum lake, Payi forest conservation areas are the famous.

3. Third group of visitors is the pilgrims. The religious aspects of the Tibet can be actively developed—and have great potential. Mountaineers are the oldest group of tourists. *(Dr. Daniel)*

3. WHAT IS ECO-TOURISM?

- The meaning of the ecotourism is to promote and protect natural resources by the local people and uplifting life of community **living together with species** which benefit for the local community by **sharing natural resources** and their cultures with tourist **without damaging** and exploiting these traditional and natural resources.
- Ecotourism focuses on local culture, wilderness adventures, personal growth and learning new ways to live on the planet.
- Ecotourism should satisfy several criteria



such as:

- conservation of biological diversity and cultural diversity through ecosystems protection
- promotion of sustainable use of biodiversity by providing jobs to local populations
- Sharing of socio-economic benefits with local communities and indigenous people by having their informed consent and participation in the management of ecotourism enterprises.

4. IMPACTS OF ECOTOURISM

The tourist can influence positive and negative impacts and changes in nature, environment, economic social and culture of the people.

- The negative impacts can be occurred if local community, village leaders, volunteers “Pendebeba” and management leaders are not aware of the environment conservation, not having special management and guideline polices about the eco-tourism.
- The positive of the tourism is that it can be provide benefit to nation and local community through employment opportunity for rural people and informal education of the people how to manage and implement small income generations as well as how to protect local natural resources.

“Example in Nepal: Positive impacts to women groups, many lodge, tea shop and handicraft are managed by women. Local people has also helped women to undertake highly specialized and skilful activities, such as management family guest house, transportation, providing quality services include sanitation, international food, worm welcoming to the visitors, English language and to lead linking tourism with local development and overall tourism services and business don by women”.
(*ICIMOD report*)

5. ECOTOURISM PLANNING

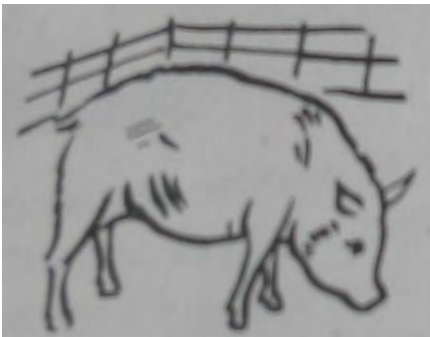
1. It is very important to think about the consequences and system of the ecotourism before you implement ecotourism program. First priority on the awareness, leadership, and management skill, technical skills for the local community, leaders and volunteers about the:
 - Sustainability of the resources and protection
 - Potential benefits and impacts from ecotourism
 - How to implement sustainable small business
 - How to welcome visitors and provide a positive services experience
 - How to promote Ecotourism as partnerships with government and line agencies.
2. Importance for the Eco-Tourism development:
 - All partners include local community, volunteers, NGOs and government needs to understand that the maximization of benefits can result only if tourist or visitor’s satisfaction and quality of the services are increases.

- Sustainable and self-reliance tourism development is:
 - **The use of natural resources should not be greater than nature can produce,**
 - Environmental conservation must be at the priority of programs,
 - All partners must be involved in the planning process for eco-tourism and community development.
 - Monitoring and Evaluation is an essential a part of the partner’s responsible to correct negative impacts from the ecotourism and Scale up positive impacts in other areas of the TAR.

1. ECO-TOURIST BUSINESS AND INCOME GENERATIONS.

Income generations can divided into two types (services and product oriented).

Production oriented such as agriculture production, local arts work, Animal husbandry, micro-



enterprise Industry,
traditional
handicraft,
clothing, thanks
and factories which
provides
community needs.



Example of success in Nyingchi and Chamdo prefectures.

- Service oriented such as business such as **Family Hotels/Guest** house, local small Restaurants, Tea shop, Trekking and Hiking guide, maintenance centers, small Medical centers which serve to tourist and community and make income for the group etc. **Example in QNNP.** The concept of the family hotel is owned and managed by a family members who lives inside the conservation. These hotels are expected to employ local people within the villages. Other locally owned businesses can be coordinated—such as a manufacturing and marketing system for local crafts that are then



sold to tourists, such as local businesses that provide guiding services to tourists. Family Hotels can be a network of emergency care for tourists and possibly, through linking to Pendeba program, for on-going care and services for local people.

- Locally managed transportations such as **Yak**, horse, human and car etc
- Travel guide and information about logistic, traveling areas, transportation, weather condition in the traveling area and which time etc. Specific information about the tourist areas and tracking roots.
- Focal point for management of tourism **garbage** collection. *Example in Lyingchi.*
- Guide and translators who know local places, rules and regulations of the government.



7. INCOME GENERATION:

- Income generation program can solved basic problem of the family economic, reduce under poverty, balance environment and supports towards village development program. *Example of local small shop!*
- The available resources and skilled human resources utilization is the income generation.
- Start with success and small scale programs which will teach you practical experience and experimentation of the activities.
- Establish income generations based on ecotourism and environment conservation.



8. STARTING INCOME GENERATION:

Before starting the income generation program, we should study about the success and local resources such as:

- Available local materials needs for the project,
- Available of local skilled man power needs for the business,
- Available Resources of financial (capital money),
- Possible market in the village, at city and international,
- Right place and target groups
- Possible profit or lost etc.

Establishing income generation without identifying their success and possibility is the main reason of the failure.

Process of the study. Which or what income generations you want to start? It should be focused on demand and interest of the users and services receivers which makes much success of the income generations. Also quality of the product and services is very important to provide the satisfaction of the users or services receivers. As doing small busies, it is very important public relationship and communication with individual seller and big business people or groups such as Hotel, Shops, export/import groups etc. Product should be based on the demand of the materials.

For example:

- a) Start with kitchen garden and distribute vegetable to Hotels, restaurant, and individual home services.
- b) Start with piggery or Poultry production and supply to restaurant and individual house.
- c) Start with Traditional handicraft and sale to tourist and supply to export groups.
- d) Start with Mushroom and herbal medicine collectors and supply to center market of Lhasa or prefecture level. It is very



important to evaluate the quality of the products in order to sustain your business and demands from the users.

Who could be users, service receiver or buyers? There are very significant role of users. User can be different groups and individuals such as individual villager, dealer, Hotels, Restaurants, Shops, Exporters, tourist and brokers etc. So income generation group should know who can be the best users according to your products and their needs and interest. There should be good communication and relationship between producer and users.

What and how to product the materials or services?

- First product or services should be focused according local needs, availability of the materials and skill of the local peoples.
- Second priority should be given to needs within country because it is easy process to supply or sale it but skills and quality of the products should be improved.
- 3rd priority should be given for export products which need more specific production skill, supply process and quality of products.

How much it will cost to produce the products? For cost effectiveness and sustainable, maximum utilization of the local available resources (man, money and materials), start with small scale, estimate demand, profits and your capital.

How to estimate the cost, profit and lost?

- | | |
|---|------------------------|
| ➤ What is total running capital, | ➤ Salary, |
| ➤ Depreciation, | ➤ Training, |
| ➤ Maintenance, etc | ➤ Packing, |
| ➤ Estimated cost such as materials, | ➤ Information, |
| ➤ Transportation, | ➤ Interest, |
| ➤ Daily utilities, | ➤ Implementation cost. |
| ➤ The detail exercises can be done during the training session. | |

How to calculate? All sales prices should be calculated including production cost such as mentioned in estimation cost, profit and lost above. For example, if production cost 50 Yuan and you want to make 10% profit. $50 \times 10 / 100 = 5$ Yuan. So, you have to add $50 + 5 = 55$. Yuan is your selling price. But your product should be competitive with other group or producers other ways only making prices

will not work out in sales. If you are not competitive with others then you should think to decrease profit, decrease production cost, produce new items etc. Investment Profit calculation = $\frac{\text{profit}}{\text{capital}} \times 100$. If result is greater than interest of the bank, it is profit.

Management and advertisement? Another important part of the income generation (IG) is management and distribution. Supply should be reached at users on the time, advertisement and informed to the users the availability of the products, and make good impression of the products and its benefits. The method of sales and distribution:

- Wait at one place for the users or buyer come every day at places.
- Supply and distribute door to door, Hotel, restaurant, shops etc.
- Some time do both but advertisement and information is essential.

How to make decision to start the income generation (IG) program? The decision should be made according to the needs and demand of the users or community. Example, if you want to open teashop but there are few teashop are already opened which can not make much profits for your business but if you open a clothing shop and other basic needs of the community and there is no other shop available. After identifying possibility market available within village, cities you can supply and profitable.

How to you manage capital or seed money for the IG? When you starting small micro-IG, you can use resources within the village such as own money, cooperative money but if you want to start large scale IG then you can get loan from different government banks and Pvt. Banks but plan is most important.

9. IMPLEMENTATION OF ECO-TOURISM INCOME GENERATION

In developing countries, the micro-income generation groups and individual especially farmers and women cooperative in rural are considered to be most effective group for the social change process. The Pendeba SCALE SQUIRED CENTER (SSC) group in Tibet has established more as an important group in promoting and strengthening environment conservation, economic, health and other development process. The SSC group and women groups



should be illustrated carry better success for their own future development. The community, government line agencies and NGOs partner have to play important role (community as implementer and beneficiaries, government as supporters on the policy, resources and NGO as technical supports). So, SSC groups, women group and individual should be clearly present as:

- Group having clearly defined Vision, Goal and Objectives.
- Promoting mobilization and utilization of locally available resources.
- Promoting social economic and local community skill development
- Participatory and community based development.
- Sustainable environmental conservation
- Specific management and attraction for the tourist

10. MANAGEMENT AND INFORMATION SYSTEM.

- Repair old trekking trails rather than make new trails which protect natural resources.
- **Organize tourism day** and cleaning and collect garbage. This need long time ahead advertisement include program agenda of cultural programs. Because tourist like to see cultural program very much and they will schedule to visit on this time. This is opportunity for local people make income generation.
- To formed eco-tourism and Conservation Management coordination Committee including women members.
- Prepare information system on tourist route and campsite.
- Collect and Prepare detailed information for hotel and campsite registration on camp and route etc.
- Update the check posts, trail routes and make more informative and useful such as Location board and altitude etc.
- Conduct training and provide License for trekking guide at local level who can explain more clear to the tourist and save environmental issues rather outside person who do not know very well about the area.
- Manage first aid kits especially for tourist and local people.
- Prepare brochures of Hotels, available services, local shopping center, tourist route, environmental information etc. So tourist can read and take care of environmental issues.



11. WOMEN COOPERATIVE:

The **women's involvement** in income generation and environment development is **essential** and effective according to the 4 decades experience of the development programs in worldwide. Activities are as follows:

- Establish women cooperative shop and handicraft etc. The shop and handicraft can establish according to traditional skill, which tourist like to buy traditional hand made materials and save traditional and cultural of the people.
- Especial handicrafts training for women in manufacturing materials from local resources.
- Can provide job for poor family and support less women.
- Organize adult literacy English language class, so that they do not need to dependence with tourist translators for small business.
- Establish experiment nurseries to produce different species and distribute seedlings to the local people and group as requested.
- Any other activities related to income generation and environment conservation can be implemented.



12. ALTERNATIVE ENERGY PROGRAM

Installed **Solar**, Bio-gas and micro-hydro power in the area but it need to improve and operate systematic and sustainable way by the user group.

Community should work on following activities:

- Need to form coordinating committee/user group and support intake repair and gabion protection around the powerhouse
- Provide micro-hydro power operators and maintenance training to local people and enable them to diagnose technical faults, maintenance and operating.



- Government has introduced solar power system and Bio-Gas in the Tibet and it needs to scale up to reached at all rural areas of Tibet. We can be improve this program include solar cooking and Bio-Gas by following activities:
 - Establish demonstrate and experiment project in Tibet.
 - Provide solar and Bio-Gas maintenance and installation training to local people, so that local people do not need to dependent to government technician when small problems.
 - Organize **solar** order system and bring solar as group from Lhasa rather individual has to go to Lhasa to purchase one solar which make mach cheaper and cost effective.
 - Organize energy saving awareness camps and training, especially for the women who are dealing an every day.
- Environment and Conservation Education Program. School children can play greet role in environment and conservation at present and future. If we can develop children's awareness on environment & conservation from school level, it will be sustainable and local resources for the future community development. Therefore, we can experiment school level education regarding environment and conservation as follows:
 - Organize environment & conservation training for the school teacher.
 - Organize quiz within the county and invite children from different counties. This method will encourage teachers, children and parents learning about environment & conservation and practical implementation.
 - Publish school books regarding environment & conservation in coordination with different department of Tibet and distribute to schools.



Partnership:

The program implementation and its working strategy is important for the success and sustainability of the program. So, program should be start with following strategy:

1. **Local community:** Local communities are implementer of the ecotourism income generation development programs in the villages, final decision makers, and sustaining the program.
2. **Government line agencies:** Supporting who have a well-built and sustainable delivery system, resource base and ability to mobilize resources and highly qualified human resources.
1. **Pendeba cooperative groups:** are considered to be main actors of social economic development scenario in Tibet Autonomous region. Pendeba have their own unique qualifications which enable them to contribute them to contribute towards economic and social change meaning awareness of people and leading SSC group program. The unique feature of Pendeba program SSC are:
 - Identification of local success and local resources.
 - Capable of mobilizing and utilizing local resource
 - Ability to teach and demonstrate new practices and reach at all levels of the community.
 - Committed to help and solve the local problems and strengthen success from their villages.
 - Highly committed, hard working and volunteer spirit among the Pendebas and mother groups.
 - Cost effective programs and locally organized projects implementation
 - Experimentation and learning center for mothers, villager and other community.

Life cycle of the Pendeba program:

1. The most of the Project have their own life cycle starting from birth to end. But the Pendeba program is considered a sustainable project with positive changes and scale up, so called self-reliance and sustainable.
2. The groups can grow by following stages which can be described as formation, organization, development and institutionalization.
3. Following characteristics can be attributed for the institutionalization of group:



- Clearly defined learning, experimentation about the income generation and social development group.

- Agreeable policy to all groups and Pendeba members.
- Representative structure in group committee
- Skilled human resource in the group.
- Shared leadership and participatory system
- Permanent source of financial and material resources

For example of Planning method:

What you want to do?	Why you want do?	When you want to do?	How you want do?	Who can help within village?	Who can help you from outside?	What training and supply you needed?	How much it cost?
Kitchen garden	To improve economic status of family	According to seasonal products.	In small scale by the family members.	Pendebas, cooperative groups, big farmers etc.	Government, NGOs, experts, business people	Technical skill Land, equipment, Seed, Fertilizer, Pesticides, water etc.	Training and materials cost, labor charge and profit.
Poultry raising	Do	As per demand of meat and egg from Hotel, restaurant public.	Large scheme	Own land, local building materials, local labor.	Government, business group, technician and NGOs	Business management and Animal husbandry training. Land, house, medicine, equipments, food, electricity, labors etc	Cost include all items mentioned in supplies and training.

5. ENVIRONMENT CONSERVATION

1. OBJECTIVE:

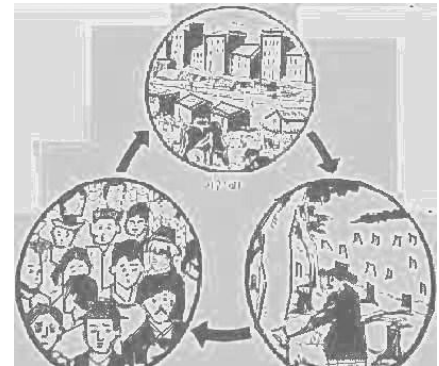
- By the end of the session, participant will have understand and aware about the natural resources, its protection, its benefits for the people and species.
- By the end of the session, participant will have specific ideas and vision for their future in terms of economic, health and sustainability.

2. WHAT IS ENVIRONMENT?

The environment is considered the air, water, soil, forest, temperature, natural resources and specious around you, me and our community. The environment is important for the people's daily life and close relationship between human and environment. Good environment means the good health, good economic, good culture and future of our children.

3. HOW DOES THE ENVIRONMENT BECOME DAMAGED?

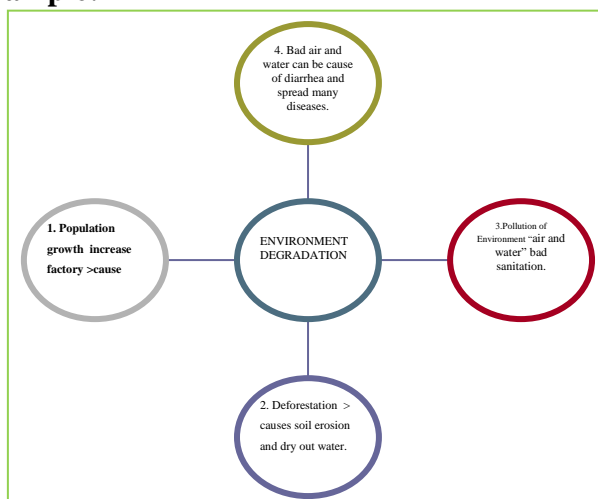
Main reason of declining environment is misbalance of natural resources protection and an over use by people. Over use of natural resources is due to population growth. Because of over use rather than protection, people have to go great distance to collect fire wood, dry out water sources, and less grass for animals.



Another key reason is inappropriate sanitation around the village: People do not use toilet and goes to open field.

Mismanaged garbage and put in open field. Do not protect water source and let in pollution. Lack of personal hygiene, so-round village and household.

For example:



4. THE FUTURE IMPACTS BY MISMANAGEMENT OF ENVIRONMENT

- The misbalance environment can impact to health, economic, social and process of the community development.
- The impact of the environment degradation, people have to migrate to urban areas to seek job and to survive the life.
- Deforestation cause major impacts to energy, fire wood, materials factory, housing, agriculture production etc. Due to decrease of production, it impacts to stander of the life of community

5. STRENGTHEN PRESENT SUCCESS

- Natural resources include forest, soil and agriculture is the life of the rural farmers. Without natural resources protection, environment can not be balance. It is very important to protect water sources, air from pollution, soil and forest. Tree plantation, sanitation, clean drinking water and effective energy use program can support to environment. Planting more tree can solve energy problem. More forest, we can get more natural resources such as mushroom, medicine, wildlife, decrease landslide increase production, decrease poverty.
- The strategy of the development is working with and through a local group, committee and organization related to natural resources and environment conservation with focusing local community participation. Without local committee, group and community participation, it is not possible sustainability of the program. In order to sustainability of the development, locally available resources such as man , materials and money is essential. The women can contribute significant role an environment protection. Secondly, every family member can contribute important role to keep healthy environment by community sanitation, household sanitation and personal sanitation. **The women participation can towards success of any**



COMPARING BASE LINE & PROGRESS DATA.



WORK DATA BASE ACTION.

development program including environment. Because there are important relationship between environment and women such as:

- Collecting fire wood, grass, water, cooking, feeding children, working on agriculture, taking care of animal and tree plantation done by women. The sanitation, toilet building, use of smokeless stove, Bio-Gas, compost making, seedling production and nursery, suitable agriculture are all related to environment conservation. It helps to improve environment and improvement of daily life of the community in terms of the economic, health, sustainability of the program but women are not or less included for any skill training, workshop and observation tours etc.

6. THE RESPONSIBILITIES OF THE PARTNERS:

- All partners (government, community and NGOs) should think ahead to minimize the environment problems when implementing infrastructure program, road contraction, establishing factories etc.
- All Pendeba program should have provision to protect and preserve the natural resources, cultural and traditional place giving priority to tourism areas.
- All community, leaders and management should have prepared rules and regulation about the environment conservation.
- Education and communication to local users or who are living inside the conservation through the government and NGO about environment is essential.

7. IMPORTANT TASK FOR THE PENDEBA :

Objective of the environment and resources management is multiple objectives, so activities should be integrated such as:

- Identify important places to manage better environment for demonstration and experimentation.
- Organize group or mass community awareness building about the environment through special program such as drama, Audio Video and observation tours etc.
- Sharing experience, skill and management of environment through the NGO, government line agencies, and volunteer organization.

- How and why we use improved smokeless stoves, solar, protection of water sources and use which are all related to the environment.
- Establish community learning centers

8. SKILLS NEEDED FOR GOOD MANAGEMENT

- How to establish Nursery, seedlings production and tree plantation.
- How use and make improved smokeless stove.
- How to install drinking water and its maintenance
- How manage garbage and village sanitation

9. SHORT MESSAGES ARE IMPORTANT AND USEFUL FOR MASS AWARENESS:

- Inform success , solution about environment problems
- Inform rapid population growth cause major problems in economic, social, environment, and important of Family Planning.
- Teach good sanitation in and out of household, use toilet, personal sanitation.
- Pvt. Tree plantation which solve household problem.
- Clear water starting from sources to into mouth.
- Alternative energy use of smokeless stove, bio-gas, solar cooker,
- Individual house can grow kitchen garden and fruit tree etc
- Manage garbage, make compos and discourage use of plastic materials
- Seasonal agriculture and agro-forest.
- Use of productive and appropriate technology
- Separate house for Animal and human

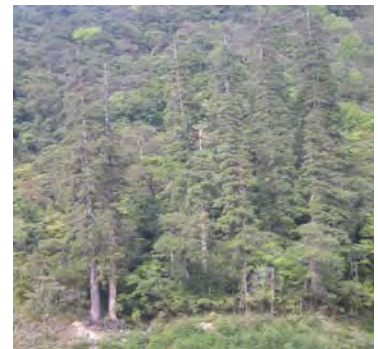
6. SUSTAINABLE FOREST MANAGEMENT AND TREES PLANTATION.

1. OBJECTIVE OF THE TRAINING:

- By end of the session, Pendebas will have identified success tree plantation and able to expend the success by motivating the villagers to care for trees and the environment. In order to achieve this objective, the Pendebas will have demonstrated and practices an awareness of the importance to trees to their lives and to a quality living environment.

2. INTRODUCTION.

Many developing countries have the success of forests are being **protected** sustainable way but **not much on production** by re-planting tree which are lost by deforest and largely due to agricultural expansion and more cattle rising. This loss is resulting in the destruction of local inhabitant plant and animal species, increased soil erosion, and flooding. This environmental degradation forces farmers to clear even more land to grow food for their families.



Therefore, sustainable forest management and **re-plantation** is essential. What is the sustainable forest management? Sustainable forest management is defined that the management of forest as per the principles of sustainable development with social, economic and environmental vision. In other wards, the sustainable forest management is use of forests and its lands that maintains their biodiversity, productivity and regeneration capacity to fulfill the future in terms of ecologically, economically and socially at local and national levels which does not cause damage to other ecosystems. Sustainable development has also been defined as balancing the fulfillment of human needs with the protection of the Natural environment so that these needs can be met not only in the present, but in the indefinite future. The field of sustainable development can be conceptually broken into three constituent parts:



1. Environmental sustainability,

2. Economic sustainability,
3. Social sustainability.

In Tibet, we have significant success on community based forest conservation and need to learn from those success. Only protection is not the final solution for the sustainable and balancing of human use and species needs. **More tree plantation** is **important** to balance the production and consumption of the resources.

Which means, the solution is plantation and protection needs to go together for the sustainable harvest of the forest?

There are different types of tree plantation such as:



1. Industrial plantations

- Industrial plantations are established to produce a high volume of wood in a short period of time.
- Plantations are grown by factories such as the paper and wood industries and other private landowners
- Industrial plantations are actively managed for the commercial production of forest products.
- Individual blocks are usually even-aged and often consist of just one or two species.
- These species can be exotic or indigenous.
- Industrial plantations are usually large-scale.

2. Farm or home plantations

- Individual community and Farm plantations are typically established for the production of lumber and fire wood for home use and sometimes for sale.
- Management may be less intensive than with Industrial plantations.
- In time, this type of plantation can become difficult to distinguish from naturally-regenerated forest.

3. Environmental plantations

- These may be established for **watershed** or **soil protection**.
- They are established for erosion control, landslide stabilization and windbreaks.
- Such plantations are established to foster native species and promote forest **regeneration** on degraded lands as a tool of **environment restoration**.
- Sustainability of **water sources** and better **productivity** of the crops.
- To improve health environment and leaving together **human and species**.



In order to implement above different plantation needs initiation from and as three way partnership, community, government and organizations to facilitate local community, Pendebas and farmers to implement sustainable tree plantation and forest management by restoring ecological stability. The Pendeba programs have to promote a healthy economy to sustain environmental and improve living conditions of the people. Pendeba program can start a Family sustainable income generation (IG) by planting a variety of trees together with fruit trees and cash crops, medicinal plants and mushrooms in an integrated system that provides food and income while protecting the environment conservation.

For the better success and effective program, Pendeba program should be implement through the local farmers, women cooperatives and individual families who have been doing success program in order to strengthen them more success so that other community can learn from it. Partner can provide assistance adopting sustainable land-use practices such as reforestation, agro-forestry and organic farming. These practices allow Pendebas and their community to raise their standard of living while adopting new farming system and planting trees to balance consumption and

production. The village peoples, who are living inside the conservation area, should understand and to think of the benefits that they derive from forests and trees. These range from products we need for everyday living, such as fuel wood, timber products for housing, agriculture equipment, wild vegetable include mushroom, herbal medicines and forage, to ways trees improve the quality of their lives, such as a cool place to rest or a good environment place for tourist, for local people a place for picnic or children playing.

Here we want to Pendebas to bring these benefits to the forefront of community thinking and the Pendeba program has to demonstrated significant successful role as partnership with government, community and NGOs on tree plantation, environment conservation in QNNP, Nyingchi and Chamdo. So, Pendebas should lead better success in these areas and other community can learn from their success. Also it needs to know the reasons why trees are beneficial to them and improve the quality of their lives.

3. BRAIN STORMING SESSION. TREE PLANTATION AND ITS BENEFITS:

Let participant think about the benefits of trees and environment. While participants thinking and discussion let them list the benefits of trees. Also asking them to think of the problems relating to trees in their villages. We will get to solutions later after they have more knowledge given in the training. At this point we just want to have them think of the benefits and the problems.



- In preparing for this session the facilitator will have drawn a large tree on paper and fixed it to a wall in the training room.
- Pointing to the tree, the facilitator will ask the Pendebas what benefits they get from trees.
- Participant will list all the benefits they get from trees.
- When someone gives an answer that person is told to draw a picture of that benefit and pin or tape it to the tree.
- When everyone has had a chance – sometimes with prompting from the training facilitator and all the benefits have been pinned to the tree it is time to discuss the benefits.
- Benefits should be discussed in terms of products we get from the trees and quality of life or ecological values trees provide.

- The discussion should then lead to why it is important to protect trees so that we continue to get these benefits.
- The giving tree will remain on the wall throughout the training and when someone thinks of another benefit they get to pin its picture on the tree.

4. RELATIONSHIP BETWEEN ECOLOGY AND TREE PLANTATION:

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. The two concepts, sustainable tree plantation and the ecosystem approach, aim at promoting conservation and management practices which are environmentally, socially and economically sustainable, and which generate and maintain benefits for both present and future generations.

5. POSSIBLE ECOLOGICAL IMPACT

It is very important to keep in mind that if natural forest is cleared for a planted forest then a reduction in biodiversity and loss of habitat will likely result.

Therefore, Pendebras should understand and teach communities the way in which the many different



parts of the environment are related. It is important that we recognize the relationships of different factors in the environment. If communities are going to **protect the wild life** and animals in the areas of Tibet then why is it **important to protect the**



trees? The pendebras need to have a basic understanding of ecology if they are going to motivate villagers to protect their environment. Also they need to know how their well being is linked to ecological processes and how improving their quality of live is related to a healthy environment. The facilitator will work with the participants to develop an understanding of the concepts of ecology and biological diversity.

6. ECOLOGY GAME.

Background: Ecosystems consist of both an organism and its non-living environment, each influencing the other. In the ecosystem the main source of energy is the sun. The producers, green plants transform the sun's energy into food, sugar and starch. Transfer of this food occurs as one animal eats another animal. The linking of different animals by energy transfer is a food chain. With different animals eating different plants and animals it becomes a food web.

- While explaining the above, assign different roles to the participants. The training facilitator says to a participant “you are a Yak” The participant then has to draw a picture of a Yak and hang it with yarn around his or her neck. Each participant gets to be a different plant or animal. One participant is the sun; many can be different types of plants, animals, insects, and bacteria/fungi.
- All players are to stand in a circle.
- Choose 4 players to go into the middle of the circle. Ask them to stand in a way to represent a food chain – who eats whom. Then bring in a bacteria or fungus and with yarn show the links between the others and the decomposer.
- Next the sun comes to the middle of the circle. The sun has a number of pieces of yarn which are passed to each of the producers (green plants). As the sun passes the yarn he describes the relationship. Each producer then passes his strand of yarn to another player and describes the relationship until everyone is holding a piece of yarn.
- Next the workshop leader takes one or two players out of the game. This represents an animal or plant going extinct. Have the players explain what happens to the entire web when one member is no longer there. (*Mike*)

7. PROBLEMS AND SOLUTION

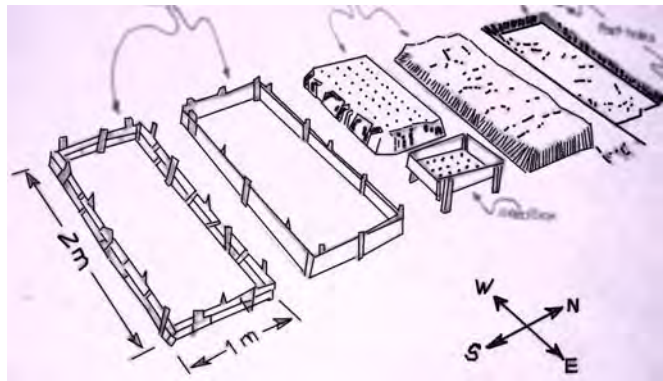
- Here the training facilitator leads a discussion of problems of protecting or growing trees in the Pendeba's villages. Some prompting may be needed to get the group to think of all possible problems.
- The facilitator has to ask the participants to write the problems on a large piece of paper that has been taped to the classroom wall.
- Discuss about the solution for the problems and write action plan.

8. EXAMPLE OF ESTABLISH NURSERY: (*IIRR training in Philippines*". DENR/IIRR/FF)

One of the action plans could be nursery establishment and management but they need to know how to do it. Here are some steps to make construction of a nursery more successful. Select good site. An ideal location would be a place near the house (so that the nursery is often visited and well taken care of), with good soil, near a reliable sources of water and away from shading tree. Avoid placing the nursery near tree of the same species to be rising which may spread their disease and pests.

9. LAYOUT THE BEDS:

- Pot beds made with sidings of staked in place. Better during wet season.
- Raised seedbeds.
- Pot bed dug into ground with straight sides. Better during dry season. (15 cm depth).



Building the nursery structure.

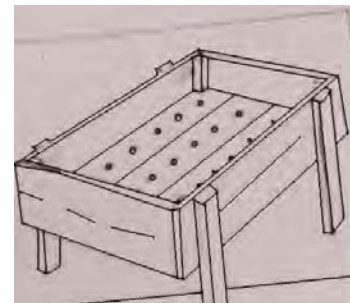
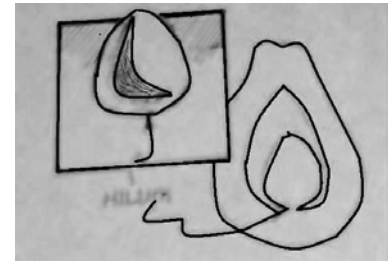
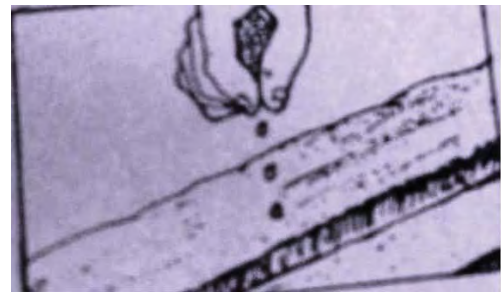
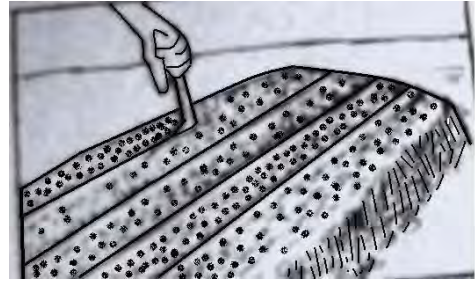
- Fence all around to keep out stray animals.
- High shade construction for community nursery.
- Full enclosed structure of one bed for individual farmer.
- Low shade. Roof easily lifted of for rolled back when working on bed.

Prepare the germination bed:

If many seedling to be raised as in for a fuel wood or timber plantation, it is generally easier and cheaper to raise them in a seedling bed bared-root transplant them. This technique works best with hardy species with a strong taproot. Bare-root seedlings are easier to transport and plant than potted seedlings. Seeds of low or unknown germination percentage are best sown in a seedbed or seed box and then transplantation, if desired.

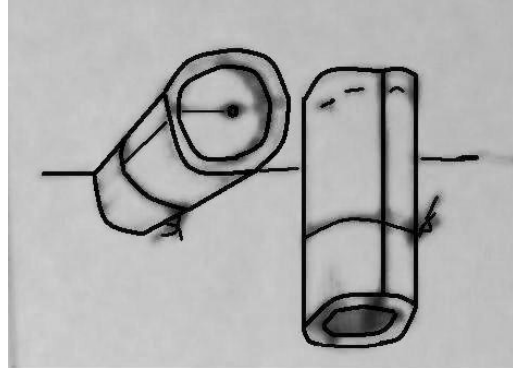
Seed bed:

- Loosen the soil and make a raised bed, narrow enough to allow for weeding without stepping on it.
- Add compost and river sand, mix well. Sand loosens up the soil for better drainage and easy uprooting of the seedlings.
- Level the bed. Using a bolo or a stick make shallow furrows.
- Sow the seeds (treated if necessary) in the furrows. Allow sufficient room for the seedlings to grow if they are to be directly out planted. If the seedlings will be transplanted to pots when they still small, the seed may be sown more densely.
- Cover the furrows thinly with soil no more than the thickness of the seeds.
- Scatter wood ash all over the seedbed to prevent ants and snails from eating the seeds.
- Water the seedbed. Protect the seeds from being washed away during heavy rains by covering the seedbed with plastic sheets.
- Make sure to allow enough time for the seeds to germinate. Some tree seeds, such as mahogany, may take a full month to germinate.
- Use a wooden box seed box for very small seeds.
- Build a wooden seed box with 10 cm deep sidings and with holes in the bottom for drainage. An old washbasin can also be used if holes are punched in the bottom. Elevate the seed box to allow drainage.
- Prepare medium of the equal parts soil, sand and compost. If possible, screen the soil through fine wire mesh to break up any clods or lumps.
- Cover the bottom with 3 cm layer of pebbles or gravel, and then fill the seed box with the medium.
- Pour boiling water over the seed box to sterilize it and to prevent damping off.



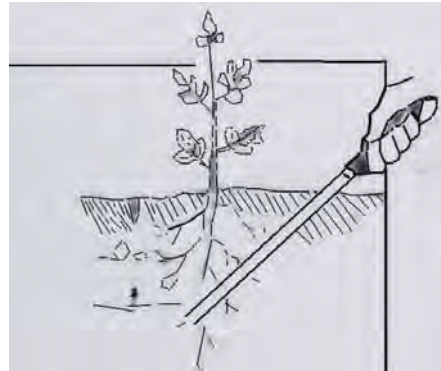
Transplant seedlings into individual pots:

- If only a few large seedlings are to be raised it is better to pot them. Fruit tree seedlings are almost always spotted, as rootstocks for budding and grafting. Large fruit tree seeds of good availability may be sown directly into pots. The point on the seed where it is attached to the fruit is called the hilum. This is where the root will emerge, so plant the seed with this point downwards.

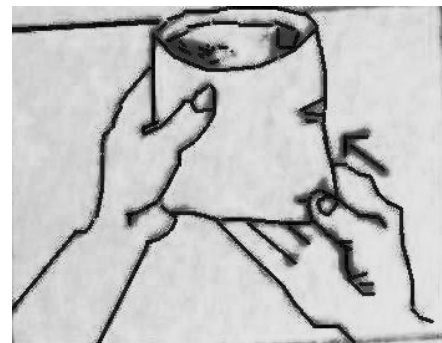


Prepare the seeding

- pots as the seeds are starting to germinate.
- Mix equal parts of sand, soil and compost. Pulverize soil to break up clods and lumps.
- If seedlings bags are to be used, perforate the bags and fill them with the medium up to the brim, firm enough to stand. Push inwards the two pointed ends of the bags to flatten the bottoms. Arrange neatly in the nursery.
- Use small (4" * 6") plastic bag for forest and fuel wood trees and others which will be out planted in 4 to 6 months. Use large (6" * 8" or larger), sturdy bags for large-seeded fruit trees, for rootstocks and other trees kept in the nursery more than 6 months.



- Seedlings are ready to be transferred to individual pots when they have developed at least two true leaves. Water the seedlings and the seeding pots. After about two hours, start transferring the seedlings. Thrust a pointed stick in a seeding pot to make a hole. Plant one seedling per pot taking extra care not to break the roots or bend the tap root.

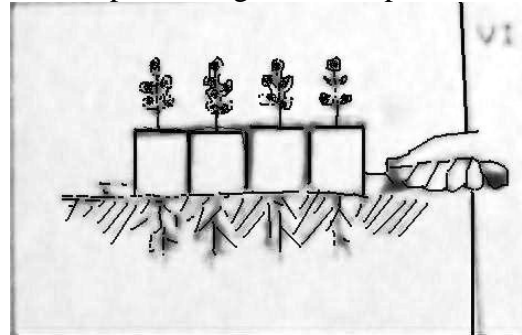


Press the seedling base firmly but gently with the fingers to make sure seedling is stable.

- Water the seedlings daily. Weed as needed.

Prune tap root to develop a stronger and more compact root system.

- If the tap roots have penetrated the bottoms of the plastic bags or other pots, left the seedlings off of the ground or slide a bolo under the pot to prune tap roots.
- Prune bare-root seedlings with a bolo or a sharp spade thrust in the bed or diagonally. Cut the root at about 20 cm length.



Harden off the seedlings a month before field plantation.

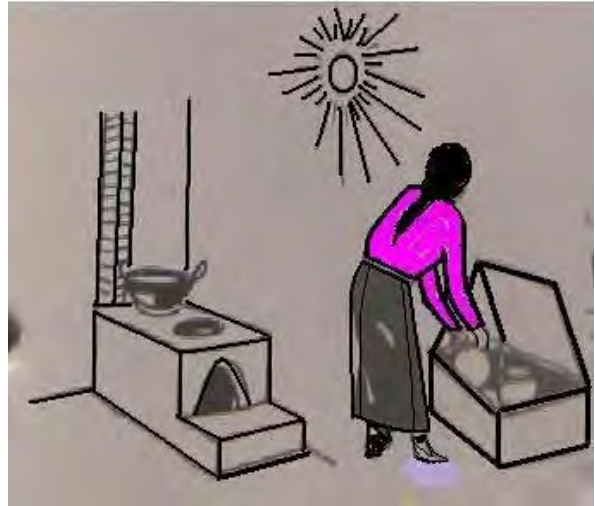
- Gradually remove the roof over the seedlings until they grow in full sun.
- Reduce frequency of watering to every other day.
- If seedlings are overgrown, the shoots and leaves need to be trimmed back.

Save the trees using appropriate technology.

The fuel wood crises in the most of the developing countries (especially) rural villagers and the rural areas of the Tibet have same problems. So, conserving available fuel wood is essential for future of rural communities. The less wood there is in an area, the more the consumption of firewood threatens the survival of forests. Also, more often than not, growth rate of trees is out placed by the rate by which they are cut. Fortunately, there are some simple ways of conserving firewood.

1. Use trees with high calorific value.
2. Use trees at the right age.
3. One- and a half inch diameter wood would be ideal. It is easier to dry and will provide enough burning surface.
4. Improve wood drying. Moisture affects the heating value of wood. A wood with 50% moisture content provides at most 57% of its heating value as it utilize the remaining heat to dry it self.
 - Dry them under the sun for two consecutive days.
 - Gather the sundried wood before the sun sets. Do not gather them late at night as they absorb moisture from the atmosphere very fast.
 - Pile them in an elevated and shaded platform to avoid their absorption of moisture from the soil.
 - Protect sun dried firewood from rain.

- Dry wood for next meal cooking over the stove to further remove moisture.
5. **Use improved stoves.** Open-fire stoves are to have 10% or less efficiency in moderate breeze. Improved woodstoves can give as much as 25-35% efficiency, saving as much as half the volume of wood used in open-fire stoves.
- Before cooking hard-coated seeds like mug beans and cowpea, soak them in tap water overnight. For tough meat add papaya or any other material known to speed up cooking.
 - If food being cooked is brought to a boil, reduce firewood, maintain one or two pieces only just enough to maintain the simmer.
 - If hot food is desired, construct a hay box to keep the food warm. No need for reheating.



8. ORGANIZE OBSERVATION TOUR

Pendebas will have observed **successful trees plantation** and forest growing in the Tibet or other place and learn community practices and programs implemented related to trees and nature conservation. By end of the training, review the success and problems with growing trees that the Pendebas identified in the training. Be sure that each of the success and problems has been addressed in the training and action plan. The training facilitator will then direct the pendebas to discuss ways that they can work in their villages to promote tree growth and protection. Here we want to hear from them about ways that they can motivate their villages. What they plan to do. What help and supports they need to get the action plan done.



Action planning: Participant (Pendeba) should have prepared an action plan for tree planting and protection in their villages. Also ask Pendeba prepare sing a song about the forest to present by the end of the training program. Song, drama and short messages are the important tools for community awareness building.

7. AGRICULTURE AND KITCHEN GARDENING.

1. OBJECTIVES.

By the end of the session, participants will have basic skills about agriculture and its diversity, kitchen gardening and able to teach to others and growing green vegetables at their villages.

2. INTRODUCTION.

Agriculture and livestock are the main sources of income of the people in Tibet. It is one of important sector for the eco-tourism program.

Agriculture is biodiversity includes, domesticated crop and 'wild' plants, including woodland and aquatic plants domestic and wild animals within field, and aquatic ecosystems. Agricultural biodiversity is not only the result of human activity but human life is dependent on it. Agricultural Biodiversity provides sustainable production of food and other agricultural products. Ecological and social services provided by agro-ecosystems such as



landscape and wildlife protection, soil protection and health, water cycle and water quality and air quality etc. These agro-ecosystems are used for agriculture - are determined by three sets of factors:

- the genetic resources
- the physical environment
- the human management practices.

3. ACTION PLAN FOR PENDEBAS.

There are virtually no ecosystems in the world that are "natural" in the sense of having escaped human influence. Most ecosystems have been to some extent modified or cultivated by human activity for the production of food and income and for livelihood security. Under this program, following activities can be implemented:

- Kitchen gardening training.
- Conduct vegetable nursery raising training

- Organize agriculture, tourist, and handicraft exhibition at suitable place.
- Establish Private agro nurseries and sale seedlings
- Provide livestock health training for local people.
- Organize study tour for conservation farmers, livestock health worker, cooperative members etc

Most of the health Professionals and workers observes kitchen garden to mature the family and children's health in terms of the nutrition. If you have good kitchen garden with at least five types of vegetables and you know how to feed your children, your children is save from malnutrition. (See health manual nutrition and Vitamin A lesson). The green vegetable is related to night blindness and nutrition. Eye problem is an every counties including in Tibet especially in rural area. It is because of vitamin A problem, sanitation and lack of knowledge in care of eyes. Most of the eye problems in Tibet rural area are due to Vitamin A and sanitation, not using smokeless stove and lack of general knowledge about the prevention. Many people 'especially' children suffer by the night blindness problems. Such problem found in many counties and Tibet is not exception. This problem is related to the Vitamin A deficiency or not eating enough green vegetable. Also it is lack of knowledge in rural area growing green vegetable, feeding children with balance diet etc. Therefore, all Pendebas and mothers should know how to grow the green vegetable and its benefits for your children's health and income generation.

➤ **Select a plot for kitchen garden:**

- Is near the house, so that it is easy for the family to watch over it and cultivate it.
- Gets direct sunshine for all or most of the day, even in wintertime. South facing is best.
- Is not near large trees or tree roots.
- Is not shaded by trees, buildings or other structures.
- Has good air circulation, but is protected from strong winds.
- Is on level or almost level land. If it is on a slope, the bed should be terraced.
- Is near a water source (may be just below the washing or bathing place).
- Is near the compost or manure site (may be just below the cattle shed).

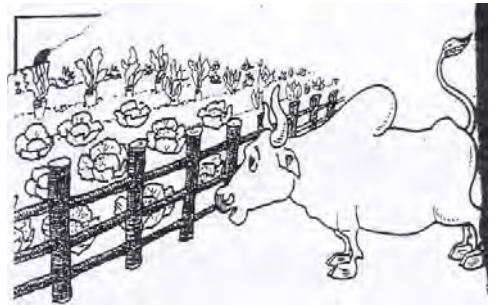


- Has reasonably good soil (if it already grows good crops, or is covered with healthy weeds, this should grow good vegetables).
- Should be protected from people and animals that might damage or steal the vegetables.
- If soil is very poor can be used but a lot of very good compost will be needed.

➤ **Fencing and protection is important.**

The biggest single problems related to vegetable growing are that of keeping animals, birds and humans from damaging, destroying or stealing the crop.

Unless you can solve this problem, do not waste time, land and money on vegetable gardening. Here are some ways of tackling the problem:



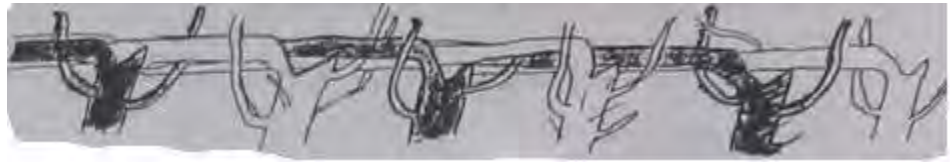
1. Make the garden close to your house and easily visible so that family members can watch over it.
2. Keep your own animals tied up and stall-feed. Especially ensure that the sheep, goats and chickens are kept away from kitchen garden. They can destroy a month's work in one morning.
3. Arrange with your neighbors and all the village people that all animals should be tethered or look after them. If the village leader do not agree, it will be hard to expect other people to keep animals off the gardens.
4. If the whole community starts growing vegetables, everyone has an interest in restraining the animals. Sharing seeds and seedlings is a way of encouraging others to start.
5. Make sure you have a good fence and around your garden, with a gate that can be locked.

4. TYPE OF FENCES

- **Dry Stone Wall:** Gather stones from around the garden site and build the wall on a good foundation. To keep cattle out, it needs to be at least 1.35 meters high, and to have thorny plants growing on top as an extra deterrent. Every 50 cm. and at the top, through stones should be used to bind the two sides of the wall together. These are stones, which are the thickness of the wall itself.

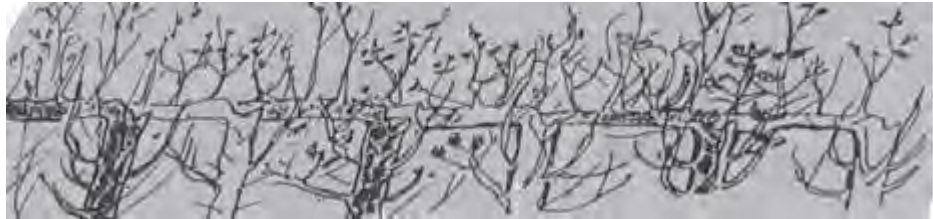
- **Thorn Hedge:** At the beginning of the rainy season, plant cuttings to make a dense thorn hedge. Blue thorn is the best variety to use, but other suitable varieties may be locally available.

Take cuttings 30 cm. long from a healthy



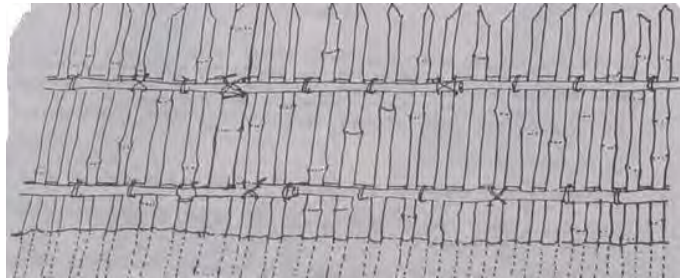
bush. You will need 10 cuttings per meter. Select healthy vigorous shoots of last season's growth, preferably from low down on the tree, and as thick as a man's little finger, or just slightly thicker.

Each cutting should be trimmed so that side branches are left only on two opposite sides of the stem. All other should be cut off to leave you with a flattish cutting. This trimming will enable the



plants to grow quickly and will encourage only those branches, which are needed for filling in the hedge space.

- **Bamboo Or Wooden Fence:** Cut straight lengths of wood or bamboo about 1.80 m. long, making points top and bottom. For every two meters of fence, you will need a stronger, longer (2m.) post to act as stabilizer for the fence. Dig holes 50 cm. deep at 2 meter intervals around the garden boundary, at the garden corners, and either side of the gate. Place these in postholes, and ram the earth firmly around their base so that they stand strongly upright. Now hammer in other lengths of split wood/bamboo at 7.5 cm. intervals between the posts. Use long lengths of split bamboo or other strong material to make two horizontal barriers, one 30 cm. above the ground, the other 1 m. from the ground. For each horizontal barrier, use two lengths, one on either side of the uprights, and tie these tightly together with rope of fiber.

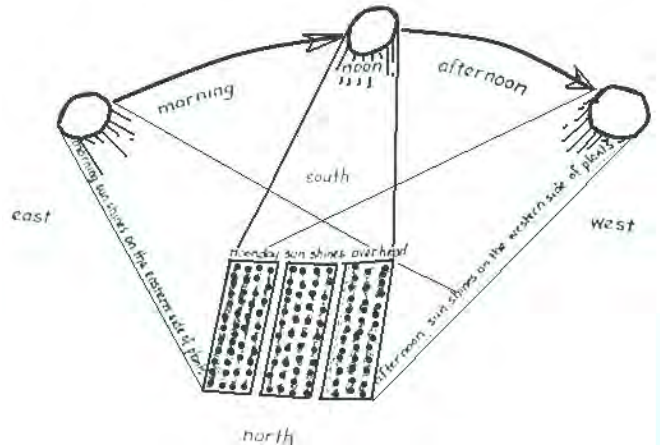


5. LAYOUT OF GARDEN PLOTS

Decide on the best layout of the garden in order to get:

- Maximum sunlight and minimum shading effect of plants on each other.
- Plots, which give maximum growing area and allow easy cultivation and harvesting.
- Minimum path area.

Sunlight and shade: It is best to make the beds on a north south orientation, so that the rows of plants will get sun on both sides, one side in the morning and the other side in the afternoon. In the mornings and afternoons, tall plants will throw a shadow on surrounding smaller plants and so reduce the sunshine available to these smaller species. In summer, when the sun is directly overhead, this is less critical, but in winter time, when the sun is directly lower in the sky and casts longer shadow, this is an important consideration.



Try to overcome this by

- Planting tall plants at the northern end of the garden.
- Planting short rows of tall crops to minimize the solid barrier effect of a longer row.
- Planting crops that require full sun for the whole day at the southern un-shaded end of the garden along with smaller species, and planting varieties that will tolerate some shade on the eastern and western side of taller crops.

Sunlight: All vegetables need as much sun as possible in the winter months (specially in Tibet), but in the clear hot times before the monsoon, some vegetables are able to tolerate some shade or may actually prefer it.

6. PREPARING THE SOIL

Double digging is a method of cultivating the soil so that:

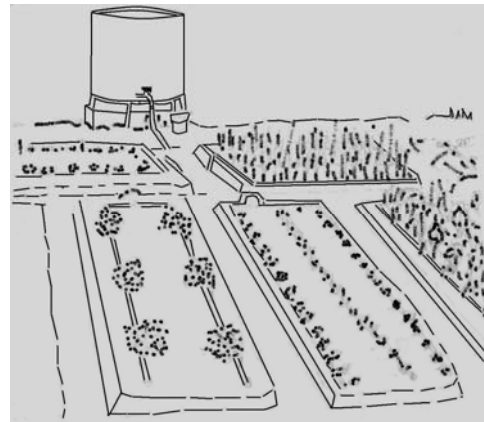
- The soil is loosened to a depth of 60 cm to allow air, water and roots to penetrate easily.
- Nutrients in the form of compost, manure or fertilizers are mixed into the soil.

- Even poor soil becomes progressively deeper and more productive.
- Worm and helpful micro-organisms are encouraged.
- To double dig a new 30 cm square meter garden will probably take the best part of a week, but the results will repay this effort and in following seasons double digging can be completed in a day or two.

Soil Additives: You will need enough compost for mixing with the topsoil layer. Allow one Tsepo for every 5 square meters if the soil is good, or one Tsepo (local basket) for every 3 square meters if the soil is very poor. You will need rough organic waste material for mixing with the subsoil layer. This material should not be already composted. It is better if it comprises fairly fresh scraps, peel, straw, etc., because then they will break down slowly in the subsoil and be available for deeper roots when they develop. If the soil is very clayey, get sand to mix in with the topsoil and compost.

7. WATERING AND WATER MANAGEMENT.

1. Approximately 90% of a plant is water, so the maintenance of constant water supply to a plant's roots and leaves is essential for its growth and survival. Just as a person will die after three to six days without water, so many plants will wilt and die in just a couple of dry days. A seedling deprived of moisture could die after just a few hours without water.
2. Under natural conditions, water is available to plants through rain and dew, through rivers, streams and other watercourses, and through water surrounding the mineral fragments in the soil and absorbed in the sponge like organic matter. In periods of dryness, as surface water dries out, so deep ground water is drawn up by capillary action into the subsoil/topsoil layers.
3. As a general rule, it is better to give good deep watering one or two times a week rather than to give daily surface watering. By 'deep watering' we mean allowing a continuous fine sprinkle of water to flow through the topsoil and the subsoil for may be thirty minutes so that the soil becomes thoroughly damp but not waterlogged. We are trying to reproduce the situation in nature, where rain falls in sprinkling showers not just for two minutes or so, but



for twenty minutes or more. Such good rain usually starts lightly, builds up in intensity and then eases off. This pattern is ideal, because the fine gentle rain at the beginning dampens the soil and allows better penetration from the later heavier flow.

8. Frequency of watering.

The principles of good watering are:

- Water before the plant is stressed by lack of moisture. If stress develops, there is set-back in growth and increased susceptibility to diseases.
- Give less frequent deep watering rather than frequent shallow watering. With shallow watering, the roots remain close to the surface, whereas deep watering encourages the roots to penetrate further to where moisture and nutrients are more reliably available.
- It is generally best to water in the evening to allow the water to soak into the ground rather than to be evaporated. However, in cold weather it is best to water in the morning (specially in Tibet Himalayan areas) so that plants are not cold and wet during the night. If this is not possible, water in the afternoon whilst the soil is still warm. Seedbeds should always be watered in the morning.
- Plants should not be watered on their leaves in strong sunlight, for this will cause the foliage to burn (water on leaves acts like a magnifying glass for the sun's ray). In conditions that encourage light, downy mildew or other diseases, it is better not to apply water to the foliage, but directly to the soil under the plant's foliage.
- By observation, you will establish the appropriate frequency of watering for your particular crops and conditions. Seedling require frequent watering until established, whereas mature and hardy vegetables may need only 15-25 minutes of deep trickle watering per week.
- Inset a spade into the soil half an hour after watering. Pull it back to make a V-shaped slot in the soil so that it can be seen how deep the water has penetrated. The water should penetrate at least to the bottom of the main root of the plants.

9. THE CASE AGAINST USING THE CHEMICAL PESTICIDES.

Whenever possible, pesticides should **not** be used, for the following reasons:

- Pesticides are dangerous poisons, capable of harming people, animals, birds, insects and fish, and of polluting air, water and soil. The long-term effects on the environment and on health are still not known.

- Pesticides kill off beneficial insects as well as the target pests. Some of these useful and desirable insects and organisms are as follows:



BEES AND OTHER POLLINATING INSECTS	These pollinate flowers, enabling seed and fruit production. Bees also produce honey.
EARTHWORM	These live in the soil, helping to break down organic matter, aerate the soil and bring up nutrients from deeper soil levels.
LADYBIRD BEETLES	The young of the ladybird beetle feeds on aphids, which are a major sap-sucking and virus-spreading insect.
ASSASSIN BUGS	These bugs are beneficial to the garden. They eat leafhoppers and other pests.
LACEWINGS	These eat aphids and mealy bugs.
AND THERE ARE MANY OTHERS.	

If these populations are destroyed, the complex balance of nature in that farming area and beyond is also destroyed, with disastrous results. Without their natural predators, many pests will multiply rapidly, reaching plague proportions in a few generations.

- With continued use of pesticides, a strong and resistant pest population is built up. This happens because there are always some insects in a target species, which are tougher and less sensitive to a particular chemical than the majority of the species. These live through the first spraying and mate with other survivors and so reproduce generally more resistant offspring, many of who survive the next spraying. Within several generations, a very resistant population is built up. The result is that the farmer gets diminishing results even with more frequent spraying.
- Pesticides are very expensive.
- Pesticides must be brought in from outside the village: many even are imported from other countries. Buying from these outside sources drains the community's finance and retards self-sufficiency.

10. LOCAL AND NATURAL CONTROLS IS THE BEST:

There is alternative for pesticides by local resources and natural controls. For example:

- Wood ash sprinkled around plants can impede crawling insects.
- A spray can be made of 4 cups of lime and 4 liters of water. This is left to stand for some hours, then is strained and sprayed on cucurbits to control maggots and cucumber beetles.
- Garlic, chili peppers and turmeric root can all be made into sprays crushed and added to water, which is then strained and sprayed onto vegetables plants.
- Cow urine mixed with 1-6 parts water can be used as a spray against aphids, caterpillars and mites. Experiment to find the right dilution for your crop.
- 2 cups of fine white flour well stirred into 5-10 liters of water can be sprayed against mites and aphids early in the morning. The sun dries the mixture on the insect's bodies, causing them to die.
- Soap and water can be used as a spray against aphids.

11. VEGETABLE SEEDS AND SEEDLING.

Good seeds are necessary for a good harvest. If the seeds are old, damaged, and diseased they may fail to germinate or will produce poor quality of vegetable. The quality of seeds depends on selection, harvesting, drying and stored. If you are save or produce your own seeds follow this:

- Select the very best plants or fruits from which to harvest seed. Do not save seed from plants which are flowering out of season.
- If possible, harvest seed in fine, clear weather, not in damp conditions.
- After thoroughly drying the seeds in the sun, place them in strong paper bags or small muslin ones. Label each bag with the name of the plants and the date harvested.
- Store seeds in a cool, dark, dry place. Take particular care in monsoon time or in damp misty weather, for the seeds are prone to dampness (which could prematurely begin the germination process) and to mould.

12. IF YOU BUY SEEDS FOLLOW THIS:

Get them only from a reliable source. Inspect the seeds and buy only good one.

- The seeds should look clean.
- They should be even in size and color.
- They should not be mixed with other types of seeds.

- They should be few broken, cracked or chewed ones.
- There should be no discolored seeds; these are usually diseased.
- They should not smell or look moldy.
- They should not be small or wrinkled, for such seeds are usually poor.
- If they have powder on them, inspect the seed skins carefully for holes. Powder is usually a sign of insect activity inside the seeds.

13. FOLLOWING VEGETABLES CAN GROW IN TIBET ACCORDING TO THE ALTITUDES:

1. Radish. 2. Onion. 3. Tomato. 4. Beans. 5. Chinese Cabbage. 6. Garlic. 7. Carrot. 8. Cauliflower. 9. Pepper Chili. 10. Pepper Sweet. 11. Potato. 12. Other green vegetables. 13. Mustard green etc.

14. PRUNING IS VERY IMPORTANT TO THE GROW THE BEST VEGETABLE.

- Monthly pruning or every 15 days pruning is needed.
- There are local systems growing green vegetable and not necessary follow the above systems but important is growing healthy green vegetable to keep your children in healthy, save your money buy vegetable from shopkeeper and also can make income from selling vegetable if you grow more than you need.

.....

REFERENCE AND RESOURCES OF MATERIALS:

1. **IIRR training in Philippines". DENR/IIRR/FF)**
2. **UNICEF/UNFPA**
3. **UMN (Peter J.S).**
4. **ICIMOD**
5. **Dr. Daniel Taylor, Dr. Mike Rechlin, Future Generations.**