EDUCATION ON ORGANIC AGRICULTURE IN NEPAL

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ABSTRACT

Organic agriculture is often appreciated for its ability to remain productive while keeping the quality of the environment maintained or enhanced, and natural resource conserved. Organic production system is of an immense importance for our country as we have no congenial conditions for high external input intensive farming – undulated and fragmented landscapes; chemical fertilizers and pesticides are not of common reach; imbalanced and irrational use of harmful agrochemicals prevails; and resource degradation and food poisoning are on rise. In addition, diversified agro-ecological pockets with highly regenerative natural resources are available. Organic agriculture is not a new practice for Nepalese farmers as we were practicing agriculture from the time immemorial as a source of livelihood, which was completely organic. However, pervasive use of agro-chemicals to increase the production, in certain productive farming pockets during the last sixty years, and their negative consequences have raised the concerns on the quest for alternatives to this system. This has necessitated the reinvention of the practice of organic agriculture with appropriate amalgamation of traditional knowledge and scientific innovations. Awareness of the dangerous effects of agrochemicals and basic knowledge on alternative technologies is an important concern in this context. Capacity building through training and education is one of the basic prerequisites to advance towards wider adoption of organic agriculture by the farming communities in the country. This paper succinctly describes the status of education on organic agriculture in Nepal.

INTRODUCTION

Agriculture has been traditional and dominating occupation of Nepalese people from ancient times and remains as an integral part of the rural societies. It is the backbone of the national economy and the source of livelihood. The share of agriculture in economic growth and social development of the country has been significant. Due to various problems in agriculture and availability of other easy and less risky options brought about by the time, and the development processes, in recent years, the contribution of agriculture to the gross domestic products (GDP) has been going down and, presently, is about 34% (SINA, 2010). However, it remains as the main life supporting system for most of the rural communities and the reliable source of income for the farmers/ entrepreneurs in the vicinity of big cities and along the road sides. Similarly, farmers involved in the farming of plantation crops like tea, coffee, sugarcane, etc. heavily rely on these crops for their annual budget.

Agriculture as a production system needs energy and input for its functioning and outputs generation. The level of input and energy use determines whether the system is modern/high external input agriculture or subsistent, traditional/ low external agriculture, and so is its impact on the environment. Nepalese agriculture used to be subsistent without the use of any external source of energy (fissile fuels) and inputs (seeds, chemical fertilizers and pesticides). It used to rely on natural resources such as inherent soil fertility, locally available agro-biodiversity, recycling of organic matter, long fallow period, no tilling in steep slopes and so on, which made the system self sustaining and environmentally friendly. Integrated farming was the core of the production system. Nothing would go waste as the output from one component would be the input for other component/s making almost closed system. There used to be social coherence within the farm/community systems of a village, and often extending up to the upward-downward linkages among the communities from mountains to flat lands. These practices were common till 1950s and still exist in many parts of the hinterlands in hills and mountains. However, as the population grew with concomitant increased demand for food, the system as such was no longer able to feed the increased number of mouths. Not only this but also the changing life style of the farm family, commercial opportunities brought about by urbanization and other social changes put more pressure on agriculture with ever higher expectation to be fulfilled. This necessitated an intervention, which was made through the introduction of high yielding

varieties of food crops and associated production practices and agro-chemicals- agricultural intensification or modernization.

Modernization of agriculture based on intensive land use and external inputs, imported short duration and high yielding varieties of crops, chemical fertilizers and synthetic pesticides in Nepal was started in 1960s, which was successful only in the areas endowed with congenial conditions for it, and for the short term. In the long run, time showed many drawbacks of modern agriculture particularly the degradation of resources, health hazards and ever increasing dependency of the farmers on imported inputs creating socioeconomic maladies. Intensification of agriculture, with an indiscriminate use of agrochemicals resulted in pollution of water, air and soil; degradation of ecosystems; health hazards and economic losses (Pokharel and Pant, 2008; Pokharel and Pant, 2009). Similarly, monoculture based farming displaced the local land races, plant diversity and associated knowledge base on which the farming systems relied for centuries. Soil degradation is one of the major agricultural problems in Nepal due imbalance use of chemical fertilizers, among others. A recent report based on the analysis of soil from fourteen eastern districts has shown the severe degradation of soil due to continuous and imbalance use of chemical fertilizers without giving due attention to the organic manures (Dahal, 2011). Food quality is another important concern of the present day because of careless use pesticides in the crops and their residues in the food. Callous use of agrochemicals banned in most other parts of the world is still in common use in Nepal. Tomatoes are dipped in diluted DDT, cauliflowers are sprayed with a pesticide cocktail the day before they are plucked, and chemicals like Aldene and Metacid are regularly used (Dahal, 2010). Recently, fifteen food samples from different locations of Kathmandu valley were taken and tested. None of the samples were found free from pesticide contamination. They were contaminated with one or the other of the ten varieties of pesticides and the level was highest in vegetables (Dahal, 2011). The result is the soaring health problems related to pesticidal poisoning. A recent report issued by the Cancer Relief Society has shown that cancer occurrence in Kathmandu has rang the alarm about carcinogenic risk posed by chemicals in vegetables and fruits (Dahal, 2010). Similar is the report from the Cancer Hospital, Chitwan: cancer cases recorded numbered 4500 in 2008 against 800 of that in 1999 (Thapa, personal communication). Eutrophication is threatening the natural water reservoirs and rivers due to the draining of nutrients into them. Local knowledge base of farming is being eroded and local resources are ignored, and so is the case with local land races and animal breeds along with their production practices. Additionally, as the farmers are tempted by higher returns using chemicals, for short term, and hence, the increased affinity to these chemicals is making them ever more dependent on external inputs jeopardizing the self reliance and rendering unsustainability to the system.

In this context, organic agriculture stands as alternative farming system to produce safe and healthy food sustainably without seriously hampering the environment and ecology. Organic farming emphasizes on recycling techniques and low external input with high output strategies based on enhanced soil fertility through maintaining diversity at all levels and making soils robust, healthy and productive. It links productivity with ecology and creates livelihoods in rural areas in sustainable way. Nepal, a country bestowed with plenty of highly regenerative natural resources (forest, soil and water) by nature, has a tremendous potential for organic agriculture. It covers about 0.1 percent of the earth's surface but hosts rich bio-cultural diversity, extreme variability in topography forming various ecological niches with varied potentials, variations in soil and microclimate resulting in the most diverse ecosystems occurring within a relatively small area in the world; 118 ecosystems, including 35 forest types and over 8 types of wetlands (WI, 2007) and is the home to 2% of flowering plants including 600 indigenous plant families and associated local knowledge base. In this scenario, organic farming that integrates local resources and potentials with scientific innovations and attempts to work closely with nature in producing agricultural goods and services may be the right choice. As an additional benefit, the shift to organic will make the farmers' access to international organic market easy and country can bargain in international carbon trade.

Despite promises, there are many problems and information gap in making organic farming popular among the farmers and to reap its benefit. It is in its infancy and lack of awareness; appropriate technology and institutional support are the obvious hindrances for lifting up organic agriculture to the required height. Farmers have been applying chemical inputs in the name of commercial farming because either they do not know about the hazards or no alternative they have. There are some proven organic farming technologies but they are limited in particular palaces and within particular community.

Lack of skilled and qualified manpower and availability of the appropriate technology seem to be the major issues in the promotion of organic agriculture. Capacity building of a person so as to contribute towards organic agriculture through eco-friendly farming and up scaling production and productivity appears to be one of the indispensable concerns of human resource development and management. In this sense to strike a positive change in the knowledge, skill and attitude of the agricultural manpower, training as an essential tool of technology dissemination is to be upgraded in the pace of progress with the timely required and relevant technologies. This is possible only with appropriate education programs, which is lacking especially in the area of organic agriculture in Nepal. Keeping the importance of education in promoting organic agriculture in view, this paper attempts to collect the information on the education pertaining to the perception of organic farming and using its technological skills.

METHODOLOGY

This paper is based on the information obtained from the internet searching, personal commutation and information bulletins issues by the concerned institutions.

RESULT

Browsing the websites, available literature review and discussion with the people working in the field of organic agriculture showed that the present organic movement in Nepal is not concerned with overthrowing an old order but rather in reviving an old tradition. The initiation of the movement can be traced back to early nineties when there were two private permaculture/organic farms, probably the first of this type in the country Tereda's Farm in Bhuwan Basti, and Pereira's Farm in Saradanagar in Chitwan. These farms were the landmarks and an open field for the learners of the organic farming in Nepal. The farms were being used as demonstration farms for the trainees by many training institutes for many consecutive years until they were abandoned, and now they are almost forgotten. Institute of Sustainable Agriculture Nepal (1986) was the first institute to start officially organized organic farming training, inbuilt in Permaculture Design Course (PDC), soon after its establishment. This endeavor was followed and strengthened by many institutions established soon thereafter such as Nepal Community Support Group (1989), Jajarkot Permaculture Program (1991), Lotus Land Agriculture Farm (1991), Community Welfare and Development Society (1992), HASERA Agriculture Farm (1992), Nepal Permaculture Group (1992), Ecological Services Center (ECOSCENTER), Chitwan (1994) and USC/Canada have contributed to the mission a lot (Dahal, 2011). Institute of Agriculture and animal Science (IAAS) was the first institute to start academic education on organic agriculture with few topics in Farming System and Sustainable Agriculture course offered to B.Sc. (Ag.) students in 1996. At present there are many institutions, mainly non government organizations (I/NGOs), and few academic institutions offering trainings and academic education, respectively, in organic agriculture in Nepal.

Academic Teaching

Academic institutions involved in teaching the courses on or related to organic agriculture in Nepal are the Institute of Agriculture and Animal Science (IAAS), Himalayan Collage of Agricultural Science and Technology (HICAST), Kathmandu University, Institute of Food Technology and few polytechnic institutes offering B.Sc. (Ag.) courses. IAAS offers Farming System and Sustainable Agriculture and Environment Science and Agro-Ecology courses for B.Sc. (Ag.), and Ecological Agriculture (Conservation Ecology) by the Department of Environmental Science and Ecological Horticulture by the Department of Horticulture in M.Sc. (Ag.) in which organic farming, encompassing its theoretical as well practical aspects, is taught as a viable approach to sustainable agriculture. IAAS has recently developed, and got approved by the University Academic Council; a two-credit hour course Organic Agriculture (Appendix I) for Bachelor level and will be started soon. HICAST has many courses related to organic agriculture as an elective in its Bachelor level curricula; Sustainable Agriculture, Bio-Intensive Farming System and Livelihood, Bio-Fertilizers and Organic Farming, Sustainable Agriculture and Rural Development, and it has proposed to establish a separate department of organic farming. Kathmandu University teaches some topics related to organic agriculture in Pests and Pesticides course in environmental science curriculum in which the focus is on the natural enemy of the pests, local plants of insecticidal value and their extracts, and an introduction to organic farming (Appendix II). In Institute of Technology, Dharan organic food is taught in the courses: Food Storage Technology (M.Sc.) and Nutrition and Dietetics in B.Sc. Program. Recently, Mechi Campus,

Jhapa (with special emphasis on organic tea) and Mahendra Ratna Multiple Campus, Ilam (with special focus on vegetables) are proposing courses on organic agriculture in their forthcoming curricula.

Training

Nepal Permaculture Group (NPG) is carrying over the PDC course (Appendix III), initiated by INSAN, at least once a year and is going to be 49th slot this year. The trainee who successfully completes the course is called as Permaculture Graduate and becomes the member of NPG. The number of such graduates is 963 to date (NPG, 2011). NPG with ECOCENTRE has been conducting Training of the Trainers (ToT) on organic agriculture (Appendix IV) on annual basis with seven batches already passed out. NPG also conducts trainings on sustainable agriculture models and farm designing, and other trainings related to organic production and certification systems as per the need and demand.

Sustainable Agriculture Development Program (SADP) Nepal (2004) organizes various training programs with varied duration and thematic focuses; from short term (two-day), medium term (7-10 days) to long term, advanced training on organic farming, (one month). In a two-day basic training course the emphasis is on the advantages of organic farming in terms of social, economic and environmental concerns. The documentaries evidencing the poisonous effect agro-chemicals and success stories of organic farmers are shown during the training. This type of training seems to be an effective orientation for the farmers towards organic farming. In medium-term training, the farmers are made equipped with the organic package of practices for cultivating crops and farming animals especially through proper management of local resource with special emphasis on soil management and crop protection. The focus of long term training is either to offer the participants advanced knowledge on the cultivation of particular crop or make the participants trainers of the training with overall knowhow of the subject with additional skills of the training (Dahal, personal communication)

Hasera Agriculture Farm (1992) provides training and consultation services in the fields of Permaculture, community development, farming system & natural resource management sustainable/organic agriculture organic inspection and certification, etc. in which the center makes the participants to be able to run organic farms and enhance their livelihood. The duration and curriculum of the courses are based on the actual needs of the clients and the trainees (Hasera, 2011)

Ecological Service Centre (1994) organizes different training programs on regular basis for long time with the aim to help to boost up the capacity of an individual and organization in delivering services regarding organic agriculture in national and international levels. It conducts a 10 days "Training of Trainers in Organic Agriculture" course in collaboration with Nepal Permaculture Group which is going to be the 8th round this year. Similarly, it conducts a 12 day long Permaculture Design Course (PDC) in collaboration with NPG. The course content of both of the trainings is appended in appendix I and II. In addition it also conducts a three day long "Kitchen Gardening" course; a five day "Organic Agriculture Promotion" course; a three days Internal Control System (ICS) and Participatory Guarantee System (PGS) course; a seven day Permaculture Introductory course; etc (Adhikari, personal communication and ECOCENTRE, 2010).

Volunteer Aid Nepal (2008) works under the principle of "Development through Volunteering" and focuses its activities on the progress of disadvantaged people, and plays a role of facilitator for sustainable development by utilizing local resources. It emphasizes the skills of volunteers in the sectors of education, health, environment, human rights, agriculture in including sustainable agriculture and organic farming. (VN, 2011)

Bio-organic Agriculture Center Nepal works throughout Nepal on the promotion of rural development and education in the areas of organic agriculture and bio-dynamic farming services. It is newly established pioneer organization to promote the organic and biodynamic farming for sustainable agriculture among small-holder farmers through training and awareness creation with focus on youth, women and self-help farming groups. Center trains smallholder farmers in organic, biodynamic and nature farming methods using locally available resources, including indigenous knowledge, for maximum production to feed a growing population (BAC, 2011).

SafeEnvironment Nepal (SEN), a women led organization active in various parts of Chitwan, Kathmandu, Bhaktapur, Lalitpur districts, works with the aim of conserving environment in a sustainable way by using youth power, and trains the youth in the area of organic farming methods, promotion of ecological farming and fair trade to ensure the healthy, diverse and safe food and life. The focus is on sustainable agriculture and on how to grow own food without pesticides. Awareness raising programs on ill effects of chemical pesticides among farmers; promotion of botanical pesticides for controlling pests; training on IPM; encouraging farmers to shift from traditional subsistence farming towards modern organic agricultural system are some of the good features of the organization. (SEN, 2011).

Nepal Organic Agriculture Ctr Pvt Ltd (1996) provides skill oriented training service and conduct research and consultancy in the field of organic agriculture with emphasis on the production of organic fertilizer and herbal products using local plants along with their use in daily life and in farming (NOAC, 2011)

Society for Environment Conservation and Agricultural Research and Development (SECARD) Nepal is dedicated to provide training and other services on organic and sustainable agriculture such as training of Trainers (TOT) on organic agriculture, training on organic conversion and internal control system, basic Permaculture training, Permaculture design course (PDC), etc. Training on alternative pest management, Farmers Field School, Plant Clinic, training on the effective microorganism (EM) technology, etc. are the other areas of focus of the organization (SN, 2011)

Directorate of Agricultural Training (2003), Training Division of the Department of Agriculture under the Ministry of Agriculture and Cooperatives offers thourogh training on organic agriculture to the agricultural professionals working Government offices. The focus is on food security, conserving agro-biodiversity, promoting organic agriculture, developing the appropriate technology against the negative impact of chemical agriculture and climate change, etc. Many District Agricultural Offices have also started to include topics related to organic agriculture in their regular training programs (Poudel, personal communication and DATDA, 2011).

Corps Nepal: Volunteer Work at Organic Agriculture Farm Program is working in the field of agriculture emphasizing on its sustainability and materializing it through the promotion of organic farming/Permaculture to improve quality of life of local farmers as well as to reduce poverty. Its entire effort remains in the pioneering of organic farming, which, it states, is essential to keep ecological and environmental balance in the nature in Nepal (CWVWOF, 2011).

Volunteer & Service-Learning Opportunities in Earthville (1997) works primarily in India and Nepal and provides ecological /sustainablle services through teaching/training eco-friendly architectural services (green building concepts and design); organic agricultural training (especially bio-intensive and biodynamic methods); Permaculture landscaping, design and implementation; and renewable energy systems, design and implementation (VSLOE, 2011).

PF Nepal serving the prisoners (2008), Rehabilitation & Sustainable Farming Training Center Prison Fellowship Nepal has developed sustainable agriculture farm with rice field, vegetable garden, fruit orchard, fish pond, goat barn, buffalo shed, irrigation canals and manure pits in Chitwan where it is planning to provide training on sustainable farming to the released women prisoners and girls of the Peace Loving Children Home, Chitwan (PFN, 2011).

Volunteers Initiatives Nepal (2005) works towards women's empowerment with the aim to align their pursuit of healthy and sustainable livelihoods. The women receive skills-orientated training so that they can generate some income through projects such as vegetable farming (mainly organic and non organic as well), livestock, incense making, candle making, dry food making, and organic vegetable follow-up training (VIN, 2011).

Everything Organic Nursery, Kavre, a small but beautiful farm in Patlekhet run by Judith Chase and Jim, provides training on organic farming focusing on a wide conceptual as well as practical realm of organic agriculture and its huge potential in Nepal. The training is targeted to a wider audience but vegetable farmers

are the main clients who have been benefitted most by learning various practical aspects of the organic production system.

In addition to those mentioned above, there are many organizations in Nepal working in the field of sustainable and organic agriculture and provide training for the same. Asha Nepal (2009) works with 200 women farmers to preserve high-nutrient local seed varieties and revert to low-cost organic cultivation methods that provide a broad variety of produce for family consumption and sales. World Wide Opportunities on Organic Farms Nepal (2003) has began to set up and maintain an international organic farming research, training and development centre in Nepal with the aim to support Nepalese farmers and communities in the development of an organic agriculture sector and to promote Nepalese organic agricultural products (OAPs) on national and international levels. Sustainable Soil Management Program (SSMP) offers on site training for the farmers on such important areas like improved composting, urine collection and utilization, inclusion of legumes in farming system, etc. SNV and Helvetas are involved in training the tea (eastern hills) and coffee (Kavre, Gulmi and Lalitpur) farmers on production and certification processes. Similarly, Madhuvan Ecovillage Network Nepal, Chitwan; LIBIRD, Pokhara; AAA farm Gamchha, Bhaktapur; Himalayan Bio-organic Agricultural Garden; and many other organizations in different parts of the country are offering training package to the farmers on the contemporary issues of sustainable/organic agriculture with an emphasis on plant nutrient and pest management through locally available low cost and safe materials. However, these efforts only are not sufficient and the Government should come forward with the concrete plan of organic education, and that should be started with the incorporation of organic farming in school level curricula and make provision for organic training for the farmers in district level agricultural offices and agricultural teaching institutes.

CONCLUSION

Agriculture is the backbone of national economy and source of people's livelihood in Nepal. Chemical-intensive modern farming, introduced to increase food production, has negatively affected the agriculture and the environment. Organic agriculture, which was our traditional system, has been accepted as safe alternative option worldwide and there is a need for organic revolution in our country. The revolution, however, is not concerned with overthrowing an old order but rather in reviving an old tradition with scientific innovations. For this, we need the aware and responsible farmers and technically sound human resource. There are lots or organizations including the Department of Agriculture, MoAC, involved in the training on organic farming. Some organizations are working for quite long and some are emerging. However, the efforts seem project based, scattered and insufficient rendering inefficiency in the real field. A comprehensive study of these efforts should be made and Government should come forward with long term vision of producing the manpower starting from school level and train the farmers as per the need in district level.

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Appendix I. Approved Organic Agriculture course to be started soon at IAAS
Course Code: AGR Course Title: Organic Agriculture Credit Hours: 2 (1+1) Full Marks: 50
Theory: 25 Practical: 25

COURSE OUTLINE

A. Lectures

Unit	Topic	No. of Lectures
1	**Introduction to organic farming**	**1**
1.1	Definition, concept and scope of organic farming	
1.2	Status of organic farming in the world and in Nepal	
2	**Green revolution agriculture and food production**	
2.1	Green revolution agriculture, food production and security	**1**
2.2	Green revolution, agro-environment and farmer's livelihood	
3	**Principles of organic farming**	**2**
3.1	Principle of ecology and care	
3.2	Principle of health and fairness	
4	**Components of organic farming**	**4**
4.1	Land, soil and water	
4.2	Crop and animal	
4.3	Renewable energy source and their use	
4.4	Indigenous knowledge and biodiversity	
5	**Organic pest management**	**2**
5.1	Principle of organic pest management	
5.2	Techniques of organic pest management	
6	**Livestock in organic farming**	**2**
6.1	Integration of livestock in organic farming	
6.2	Organic animal production	
7	**Marketing of organic products**	**2**
7.1	Brief account on organic standards, certification and accreditation	
7.2	Organic trade worldwide in relation to Nepali products and WTO	
8	**Recent trends and advances in organic farming**	**1**
8.1	Research and development in organic farming	
8.2	Organic farming: Constraints and opportunities	
	Total	**15**

B. Practicals

S.N.	Topic	No.
1	Organic crop/ nutrient management	2
2	Assessment of composting (rural and urban), vermicompost, biofertilizer green manuring and mulching	3
3	Study on bio-pesticides in organic farming	2
4	Study of traditional/under exploited crops	2
5	Designing of organic farming (BIF/BIG) and economic analysis	3
6	Case study of successful organic growers in Chitwan	3
	Total	**15**

Appendix II. Organic farming related course in Kathmandu University

ENVS 305 Pest and Pesticides	3 Cr.
1. Introduction	3
a. Definition of Pest and Pesticides	1
b. Types of Pests	1
c. Types of Pesticides	1
i. Natural	
ii. Artificial or Synthetic	
2. Classification and different formulations	5
Aldicarb, Atrazine, *Bacillus thuringiensis* (B.t.), Carbaryl, Chlorothalonil, Chlorpyrifos (Dursban, etc), Chromated Copper Arsenate, Clopyralid, Cyfluthrin (Tempo, Baythroid), Cypermethrin (Demon, Cynoff, etc.), DCPA (Dacthal), Diazinon, Dicamba, Dichlobenil (Casoron, etc.), 1,3-Dichloropropene, 2,4-D, Glufosinate (Finale, Rely), Glyphosate (Roundup, etc.), Imazapyr, Malathion, Nonyl Phenol, Paraquat, Pentachlorophenol, Permethrin, Picloram, Triclopyr, Sulfometuron Methyl (Oust), Synthetic Pyrethroids, Sulfuryl Fluoride	
3. Insecticides of different generations	3
Origin and Environmental effects of Insecticides	
a. Before 1900s	1
b. During 1900-1950	1
c. During 1950-1999	1
4. Principles of pest control	12
a. Identification of particular pests of specific crops	1
b. Life cycle of some common pests in	4
Rice, Wheat, Potato, Vegetables	
Natural enemies of pests	*1*
c. Abiotic factors affecting pests	2
i. Temperature, moisture, Season	
ii. Effects of pesticides on	4
iii. Air, Water, Soil, Organisms	
5. Plant extract insecticides	*3*
a. Indigenous use of Neem, Titepati, Lemmon grass, Scented plants etc	*2*
b. Commercial plant based pesticides and its use	*1*
6. Rodenticides and Weedicides	3
a. Different rodenticides used in Nepal with their significance and control	2
b. Common agricultural weeds and their control	1
7. Treatment of pesticide poisoning	3
a. Precaution for handling of pesticides	1
b. Symptoms of pesticides poisoning	1
c. Antidotes	1
8. Biological insect pest management	*3*
Behavior and use of following animals for the management of pest	*3*
i. Lady bird, Catter piller, Wasp	
9. Concept of Integrated Pest Management (IPM)	7
a. Definition of IPM	1
b. Concept of Biological farming/Organic farming	*1*
c. Case studies of IPM in	*3*
i. Asia, Europe, America	
d. Pesticide monitoring	
TOTAL	42

Appendix III. **Nepal Permaculture Group (NPG)**

Day	Session I (09:00 - 10:30)	Session II (10:30 - 12:00)	Session III (13:00 - 14:30)	Session IV (15:00 - 17:00)	Evening Session
Day 1	Opening session, Inauguration Introduction, welcome Objectives of the course Curriculum and program	Introduction to Permaculture History of Permaculture Permaculture in Nepal and in the world	Ethics, principles and importance of Permaculture	Ethics, principles and importance of Permaculture	Slides on various aspects of PC
Day 2	Principles of Natural system Pattern and edge in Nature	Bioregionalism, Social aspects of Permaculture, Norms and value system Social organizations	Energy, real wealth, local economy, self reliance and appropriate technology	Government Agriculture policy and practices	Audio visuals- Learning from *Laddakh*
Day 3	Creating pest balance in a system, Introduction, classification/identification Designs for pest management	Herbal pesticides Tonal tonic Compost tea	Livestock and wild lives in Permaculture Aquaculture, fish farming	Natural architecture and home stead ecosystem Energy accounting and eco-budgeting	**Audio visuals** in soil and water management
Day 4	Soil plant nutrient management Improvement of FYM Composting	Multipurpose plant species for homestead gardening Urban Permaculture	Biodiversity (micro climate, forest....) conservation and management Food chain	Integrated natural resource management	Advocacy video show
Day 5	Sustainable livelihood framework	Seed saving	**WTO**, Info on farmers right, CBD, TRIPS, IPR and UPOV	Advocacy principle and practices	Group formation and allocation of HHs for designing
Day 6	Indigenous knowledge system	Identification of problems, desires, opportunities and their analysis	Soil and water management Waste water management, Water harvesting Efficient methods of irrigation- Mulching, drip	watershed management	**Video show** :Global Gardener
Day 7	Trees and energy cycle Agriculture and forestry	Analysis of present situation	Monitoring and evaluation of Permaculture practices	Soil and water conservation, Farmers experiences on organic farming	Video show: Beyond the bull dust of GMO
Day 8	Zone and sector planning	Building blocks of designing Design process and methodology	Design... (contd...) Bubble design	Design practice	**PC Quiz**
Day 9	**Meeting with farmer:** Collection of information on family, homestead, land, cropping system and seed management (for bubble design)				**Design practice**
Day 10	Design practice				**Video-** Ancient future
Day 11	Presentation of the semifinal design	----------	----------	----------	**Contd.....**
Day 12	Presentation of final design with report	----------	Design the course	Permaculture in action /planning	

Appendix IV. National Training of Trainers in Organic Agriculture Curriculum

Time> Day	8.00 – 8.30	8.30 – 10.15	10.15 – 10.30	10.30 – 12.00	12.00 – 13.30	13.30 – 15.00	15.00 – 15.15	15.15-16.45	19.00 onward
1	Inaugural Program					Review of the present learning and finding the gap		Definition, concepts and history of OA	Comedy show
2		Scope of OA		Impacts of chemicals in human and ecosystem health		Ethical, political, environmental and social aspects of OA		Case studies on the success of OA Status of OA in National and international level	Audio visuals
3		Soil and water management		Contd.		Group work in knowledge and practice related to soil and water management		Contd.	Audio visual related to soil and water management
4		Organic Pest management		Contd.		Contd.		Contd.	*Bishadi ko khel*
5		-Regulatory mechanism on OA - Comparative study of JAS, NOP and EU standard		Nepal standard of OA		Inspection, certification and PGS		Market management and product chain	OA Quiz
6		Excursion		Contd.		Contd.	Tea break	Leisure	Leisure
7		Concepts of Training Training cycle		Adult learning principles		Material preparation, training tools and use		Presentation skill related to training	*Umer 65*
8		Session plan		Group division and Topic allocation		Preparation for micro teaching		Contd.	Contd.
9		Micro teaching Group 1 & 2		Micro teaching Group 3 & 4		Micro teaching Group 5 & 6		Reflection and feed back of the individual performance	Organic song and poem
10	Review and Planning	What next to promote OA in Nepal	Tea break	Post test Training evaluation and feed back Commitment in action	Lunch	Closing ceremony Certificate distribution Fare well			