PART-I

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GUIDELINES FOR CROP DIVERSIFICATION IN HIMACHAL PRADESH

Technical Cooperation Project

for Crop Diversification in H.P.

NIPPON KOEI CO., LTD

NTC INTERNATIONAL CO., LTD

GUIDELINES FOR CROP DIVERSIFICATION IN HIMACHAL PRADESH

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LIST of ANNEXURE

ABBREVIATIONS

ADP	Agricultural Development Plan
AEZ	Agro-ecological Zone or Zoning
A/P	Action Plan
APMC	Agricultural Producers' Market Committee
ATMA	Agriculture Technology Management Agency
BPMU	Block Project Management Unit
CA	Commission Agent
CCA	Culturable/Cultivable Command Area
CDP	Crop Diversification Plan
CM	Community Motivator
D/D, DD	Detailed Design
DoA	Department of Agriculture of Himachal Pradesh State
DPMU	District Project Management Unit
DPR	Detailed Project Report
ETP	Extension Training Plan
FA	Forwarding Agent
FIS	Flow Irrigation Scheme
GB	General Body (such farmers groups as KVS and WUA)
GDP	Gross Domestic Production
GI	Galvanized Iron
GoHP	Government of Himachal Pradesh
GoI	Government of India
GSDP	Gross State Domestic Product
HHS	House Hold Survey
HP	Himachal Pradesh
HPCDP	Himachal Pradesh Crop Diversification Promotion Project
HPMC	Horticultural Produce Marketing and Processing Corporation Ltd.
IPH	Irrigation and Public Health Department
IPM	Integrated Pest Management
JICA	Japan International Cooperation Agency
LIS	Lift Irrigation Scheme
MC	Management Committee (such farmers groups as KVS and WUA)
MIS	Micro Irrigation System
MoA	Ministry of Agriculture of Government of India
M/P	Master Plan
NABARD	National Bank for Agriculture and Rural Development
NGO	Non Governmental Organization
NOC	No Objection Certificate
NPOP	National Program for Organic Production
O&M	Operation and Maintenance
OBC	Other Backward Caste
ODA	Official Development Assistance by Government
PDCA	Plan – Do – Check – Act
PMU	Project Management Unit
PO	Pump Operator
POP	Package of Practices
PPP	Public Private Partnership
PQ, P/Q	Pre-qualification

PRA	Participatory Rural Appraisal
PVC	Polyvinyl chloride
PWD	Public Works Department
RCC	Reinforced Cement Concrete
RIDF	Rural Infrastructure Development Fund
RMY	Regulated Market Yard
SAMETI	State Agricultural Management and Extension Training Institute
SAP	State Agricultural Plan
SC / ST	Scheduled Caste / Scheduled Tribe
SHG	Self-help Group
SMY	Sub Market Yard
SPMU	State Project Management Unit
SWC	Soil and Water Conservation
TCP	Technical Cooperation Project
TD, T/D	Tender Document
TIS	Tank Irrigation Scheme
TOR	Terms of Reference
TOT	Training of Trainers
TWIS	Tube Well Irrigation System
WDC	Water Distribution Coordinator
WUA	Water Users' Association

Local Words

Crore	10 Million (10,000,000)
CSKHPKV	CSK Himachal Pradesh Agricultural University, Palampur (INDIA)
GMKVA	Gagan Memorial Krishak Vikas Association
Kanal	A unit of Area, Approximately 400 m^2
Kharif	Southwest monsoon cropping season (June to September)
KVK	Krishi Vigyan Kendras (Agriculture Science Centers)
KVA	Krishak Vikaas Association (Water Users' Association / Farmers' Group)
Lakh, Lac	100 Thousand (100,000)
Quintal	A unit of weight equal to 100 kilograms
Nallah	Small River and Stream (Seasonal and Perennial)
Rabi	Winter cropping season (October to May)

CHAPTER 1

GENERAL GUID ELINES

1.1 Background

Himachal Pradesh (the State) is a hilly State located at the foot of the Western Himalayas, with an area of 556.7 million[1] ha and a population of 6.86 million. Nearly 69% of the working population in the State is engaged in agriculture, but agriculture accounts for only 20% of the Gross State Domestic Products (GSDP). The low agriculture productivity partly attributes to the fact that the area available for crop cultivation is limited to 10% of the total land area of the State due to the hilly terrain, and therefore more than 87% of the farmers are marginal (less than 1.0 ha, 68%) and small (less than 2.0 ha, 19%) landholders. Also, only 18.5% of the cultivable area has irrigation facilities, and the rest of the area has to depend on rainfed cultivation. Therefore, the majority of the farmers in the State remain engaged in traditional cultivation of food grains, and they are unable to diversify the farming to more profitable crops, such as vegetables and fruits.

The State has a considerable potential for vegetable production, with an advantage of cool climate compared to other parts of the county, as well as the geographical proximity to the large cities such as Delhi, and Chandigarh. This would enable the farmers to produce off-season vegetables and fruits, which have a large market in the urban cities with better prices. The demand for fresh vegetables is continuously expanding due to the rapid increase of population in the country, especially in the larger cities such as Delhi.

In order to boost the agricultural development and to enhance the farm income in the rural areas, it is important to increase the productivity of the existing cultivated area, through shifting from self-subsistence food grain cultivation to diversified agriculture, by adopting cash crops such as vegetables which are suitable to hilly and highland areas. For such an accomplishment, it is essential to overcome the major constraints, such as shortage of irrigation facilities, farm roads and insufficient marketing facilities.

In the Twelfth Five-Year Plan of the State of Himachal Pradesh, increasing production, productivity and farm income through crop diversification towards high value cash crop are among the priority areas of the agriculture sector.

Under such circumstances, the GoHP (Government of Himachal Pradesh) and Department of Agriculture (DoA) have commenced "Himachal Pradesh Crop Diversification Promotion Project" (HPCDP) with the financial assistance of ODA Loan by Japan International Cooperation Agency (JICA) in 2011 and are promoting crop diversification in the State. JICA is also implementing "Technical Cooperation Project for Crop Diversification in Himachal Pradesh (TCP)" from 2011 to 2015 for supporting the implementation of HPCDP from the technical aspects.

[1] Source: Draft Document 12th Five Year Plan 2012-17, Annual Plan 2013-14, Government of Himachal Pradesh, Planning Department

TCP mainly focuses on; 1) development of the Crop Diversification Model in the Pilot Area, and 2) capacity development of the extension officers. The Himachal Pradesh Crop Diversification Promotion Project under JICA Loan (Loan Project) for the expansion of Crop Diversification Model in the 5 districts of the State will be implemented in close coordination with the TCP.

The Guidelines are prepared by TCP as one the output of activities and expected to help smooth implementation of "Himachal Pradesh Crop Diversification Promotion Project" and similar other activities for crop diversification under DoA by providing comprehensive knowledge for crop diversification to extension officers.

1.2 Outline

Objectives of the Guidelines are to provide 1) the **sequence of steps or processes** perceived during the implementation of different activities by TCP, 2) the **experiences and lessons learned** /obtained through the pilot activities and 3) the necessary **technical knowledge** to the extension officers as a **model for crop diversification** in the State of Himachal Pradesh.

Although the Guidelines provide the model, which will be tools for promotion of crop diversification, organizations and human resources who *use the tools* are also indispensable aspects. Well-functioning of these two aspects together would be mechanisms for crop diversification and the most important for implementing the activities. The conceptual diagram of model, mechanism and the Guidelines for crop diversification is shown in the figure below;

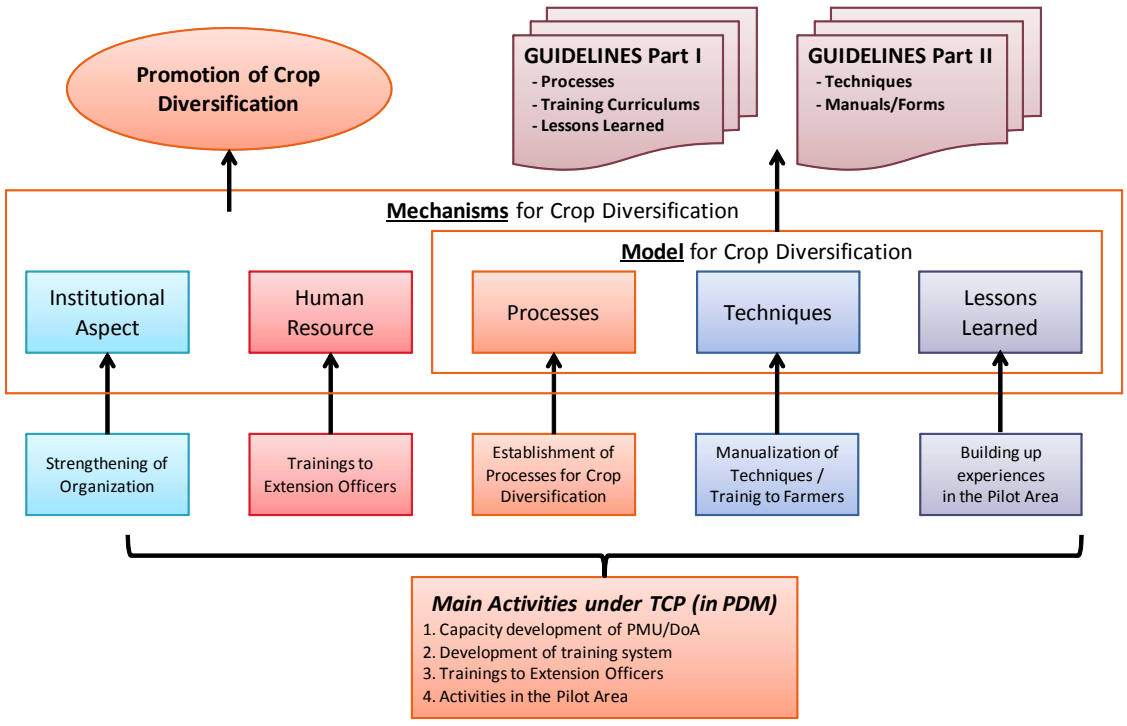


Fig. 1.1 Conceptual diagram of model, mechanism and the Guidelines for crop diversification

These Guidelines are expected to be used and replicated **by the staffs of Project Management Unit (PMU)** of JICA ODA Loan Project for their daily activity and DoA officers in the execution of similar other schemes.

These Guidelines are divided into two parts, namely **Part-I "The Guidelines"** and **Part-2 "Manuals/Standards/Forms"**. The Part-I provides you the sequence of steps or processes for promotion of crop diversification in each technical field such as "How you can disseminate agricultural techniques to farmers", "How you can form the KVA" and so on. The Part-II includes Manuals, forms and standards which can be referred /used by the extension officers/engineering staffs at the time of actual performing such activities in the field. Outline of the Guidelines are shown below:

Table 1.1 Outlines of the Guidelines

Table of Contents	Contents in Each Chapter
PART I GUIDELINES	
CHAPTER 1 GENERAL GUIDELINES 1.1 Background 1.2 Outline of the Guidelines 1.3 Overview of Crop Diversification in the State of Himachal Pradesh 1.4 Model Procedures for Promotion of Crop Diversification 1.5 Activities for Crop Diversification to Farmers	- Outline, objectives, target users are mentioned in this chapter - Overall procedure and necessary activities by extension officers and engineers for promotion of crop diversification is described
CHAPTER 2 THEMATIC GUIDELINES 2.1 Agricultural Extension 2.2 Infrastructure Development 2.3 Water Management and Operation & Maintenance 2.4 Vegetable Cultivation and Post-harvest 2.5 Self Help Group (SHG) Development 2.6 Marketing	- This chapter describes mainly the process of crop diversification in each technical field namely 1) Agriculture Extension, 2) Infrastructure Development, 3) Water Management and Operation &Maintenance, 4) Vegetable Cultivation and Post-harvest, 5) Self Help Group (SHG) Development and 6) Marketing. - In each section, related manuals in Part-II are referred.
CHAPTER 3 TRAINING CURRICULUMS 3.1 Outline of Training Curriculums 3.2 Training Curriculums for Crop Diversification	- Training curriculums for farmers for crop diversification are summarized in this chapter. - It is expected that these curriculums shall be utilized under JICA ODA Loan Project with some modification depending on situation of each sub project area.
CHAPTER 4 LESSONS LEARNED 4.1 Outline of the Pilot Activities 4.2 Infrastructure Development 4.3 Water Management and Operation & Maintenance 4.4 Vegetable Cultivation and Post-harvest 4.5 Self Help Group (SHG) Development 4.6 Marketing	- Experiences of TCP which were obtained through pilot activities are summarized in this chapter - These experiences are expected to be referred by JICA ODA Loan project for better implementation of the project.
PART II MANUALS / FORMS/ STANDARDS	
II-1 Agricultural Extension II-2 Infrastructure Développent II-3 Water Management and Operation & Maintenance II-4 Vegetable Cultivation and Post-harvest II-5 Self Help Group Development /Gender II-6 Marketing	- Manuals, forms, standards, etc., which are prepared and utilized for training of the extension officers and farmers are included.

1.3 Overview of Crop Diversification in the State of H.P.

Master Plan for crop diversification based on "the Study of Diversified Agriculture and Enhanced Farm Income in Himachal Pradesh" was formulated in 2008 under JICA's technical assistance. Based on the Master Plan, several crop diversification activities are being carried out in the State of Himachal Pradesh and "Himachal Pradesh Crop Diversification Promotion Project" is a main project for promotion of sustainable crop diversification.

Besides, Pandit Deen Dayal Kisan Bagwan Samridhi Yojna, Part 1 (2010-11), funded by NABARD (National Bank of Agriculture and Rural Development) under RIDF (Rural Infrastructure Development Fund)-XIV has been started in 2008-09 for 4 years (2008-09 to 2011-12) by the Department of Agriculture, H.P and has been approved for Rs. 1,549.162 million .The project components include; Poly houses (framed structures), micro irrigation, (sprinkler/drip system), farm tanks with poly houses, shallow wells, shallow tube wells, deep tube wells, small lift, medium lift and pumping machinery with poly houses as per feasibility.

The other project started for increasing the area under efficient methods of irrigation is 'Diversification of Agriculture through Micro-irrigation and Related Infrastructure (PDDKBSY/Part II)' was sanctioned for Rs. 1,980.885 million for three years i.e. 2009-10 to 2011-12. A new project on production of vegetables under protected cover (Dr. YS Parmar Kissan Swarojgar Yojna) has been started in 2013-14 by the Govt. of HP to promote cultivation of vegetables in the poly houses (on 85% subsidy) and to create water sources (on 50 % subsidy) individually or in groups. Besides these the DoA, HP is implementing State /Centrally sponsored schemes like Promotion of Organic farming , production of Off season vegetables, quality vegetable seeds, Ginger & Potato, National Mission on Agricultural Extension & Technology, Mission on Sustainable agriculture and Mass Media Support to Agriculture Extension for increasing the production and productivity of various agricultural crops.

Transition of vegetable cultivation in H.P. is shown in the below tables.

Table 1.2 Transition of Actual Area of Vegetables Production in Himachal Pradesh 2010-11 to 2014-15

(Unit : ha)

No.	District	2010-11	2011-12	2012-13	2013-14	2014-15
1	Bilaspur	2,430	2,535	2,565	2,693	2,932
2	Chamba	2,490	2,950	2,990	3,160	3,161
3	Hamirpur	2,890	3,100	3,178	3,606	3,794
4	Kangra	7,349	7,376	7,411	8,050	7,794
5	Kinnaur	3,383	3,453	3,485	3,494	3,499
6	Kullu	4,900	5,290	5,410	5,594	5,946
7	Lahaul &Spiti	4,128	4,164	4,155	4,213	4,186
8	Mandi	9,236	9,714	9,807	10,177	10,729
9	Shimla	11,153	11,986	12,177	12,636	12,659
10	Sirmaur	7,189	7,369	7,504	7,785	8,130
11	Solan	8,454	8,498	8,608	8,980	9,430
12	Una	1,473	1,533	1,575	1,613	1,634
	Total	65,075	67,968	68,865	72,001	73,894

As shown in the above table, area under vegetables in H.P in 20010-11 was 65,075ha, further which has gone to 73,894ha in 2010-11---2014-15.

Table 1.3 Area and Production by Major Vegetables in Himachal Pradesh from 2012-13 to 2014-15[2]

No	Major Vegetable	2012-13		2013-14		2014-15	
		Area (ha)	Production (ton)	Area (ha)	Production (ton)	Area (ha)	Production (ton)
1	Peas (green)	23,668	280,231	23,904	271,057	23,623	277,781
2	Tomato	9,930	413,709	10,373	430,789	10,800	475,965
3	Beans	3,436	40,879	3,749	46,372	3,760	47,203
4	Onion	2,268	39,362	2,338	43,706	2,439	46,257
5	Garlic	3,834	57,482	3,884	61,826	3,957	68,235
6	Cabbage	4,387	149,671	4,560	153,811	4,819	158,301
7	Cauliflower	4,351	101,710	4,526	100,071	5,191	117,012
8	Radish, Turnip, Carrot	2,261	46,919	2,542	51,410	2,769	57,349
9	Okra	2,522	30,344	2,756	34,028	2,838	35,847
10	Cucurbits	2,479	56,536	2,243	39,500	2,613	63,587
11	Capsicum, chilli	3,102	46,692	3,344	53,032	3,531	69,443
12	Brinjal (Eggplant)	1,088	23,518	1,160	26,682	1,187	27,166
13	Other vegetables	5,539	110,995	6,244	129,801	6,367	132,371
14	Total	68,865		72,001		73,894	

As shown in the above table, area and production of major vegetables in the whole state of Himachal Pradesh showed increasing trend. Annual increase in total area over 2012-13 is round 4.5% in 2013-14, while 7% in 2014-15.

Meanwhile, area and Production of major vegetables in 5 districts of Himachal Pradesh i.e. Bilaspur, Hamirupur, Kangra, Mandi, and Una also showed increasing trend as shown in the following tables:

[2] Source: Statistical Office, DoA, H.P., 2015

Table 1.4 Area and Production of Major Vegetable in 5 Districts of Himachal Pradesh[2]

(1) Peas

No.	District	Cultivated Area (ha)			Production (ton)		
		2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
1	Bilaspur	90	95	150	1470	1,550	2,550
2	Hamirpur	165	165	170	1192	1,200	1,240
3	Kangra	623	727	733	7636	8,332	8,435
4	Mandi	3479	3,602	3,690	49679	45,052	48,988
5	Una	66	50	56	645	489	608
	Total	4423	4,639	4,799	60622	56,596	61,821

(2) Tomato

No.	District	Cultivated Area (ha)			Production (ton)		
		2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
1	Bilaspur	780	730	790	29315	27337	30,020
2	Hamirpur	105	118	125	4835	5440	5,760
3	Kangra	416	475	450	15426	19125	18,538
4	Mandi	752	775	845	24666	27150	29,350
5	Una	114	114	117	3966	3966	4,172
	Total	2167	2,212	2,327	78208	83018	87,840

(3) Okra

No.	District	Cultivated Area (ha)			Production (ton)		
		2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
1	Bilaspur	210	210	285	4210	3,660	5,130
2	Hamirpur	515	575	580	5011	5,650	5,700
3	Kangra	858	902	850	9801	11,267	11,305
4	Mandi	368	380	400	4122	4,560	4,800
5	Una	80	90	98	1073	1,207	1,334
	Total	2031	2157	2213	24217	26344	28269

(4) Cucurbits

No.	District	Cultivated Area (ha)			Production (ton)		
		2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
1	Bilaspur	144	200	201	4790	6634	6,741
2	Hamirpur	408	410	410	7519	7585	7,590
3	Kangra	594	615	585	17899	19775	19,802
4	Mandi	302	317	350	5436	7133	7,300
5	Una	451	451	410	9016	9016	8,280
	Total	1899	1993	1956	44660	50143	49713

(5) Onion

No.	District	Cultivated Area (ha)			Production (ton)		
		2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
1	Bilaspur	180	200	235	3955	4344	5,330
2	Hamirpur	260	280	280	4522	5040	5,040
3	Kangra	754	752	762	14669	14638	14,896
4	Mandi	459	477	509	6335	9540	10,428
5	Una	210	220	225	3288	3445	3,567
	Total	1863	1929	2,011	32769	37007	39,261

[2] Source: Statistical Office, DoA, H.P., 2015

(6) Cauliflower

No.	District	Cultivated Area (ha)			Production (ton)		
		2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
1	Bilaspur	162	145	152	4140	3575	3,892
2	Hamirpur	238	280	280	3753	4450	4,450
3	Kangra	537	530	550	11716	12285	13,524
4	Mandi	686	720	780	22461	15900	16,770
5	Una	100	100	111	1964	1964	2,128
	Total	1723	1775	1,873	44034	38174	40,764

(7) Cabbage

No.	District	Cultivated Area (ha)			Production (ton)		
		2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
1	Bilaspur	32	32	35	1320	1320	1,470
2	Hamirpur	105	55	60	1560	820	895
3	Kangra	352	383	395	13003	14825	15,247
4	Mandi	949	990	1,045	30702	28750	29,500
5	Una	63	75	77	1554	1841	1,936
	Total	1501	1535	1,612	48139	47556	49,048

1.4 Model Procedure for Promotion of Crop Diversification

Components for promotion of crop diversification consist of mainly 1) construction of irrigation and other infrastructure facilities and 2) training/extension activities for farmers. These **activities for the promotion of crop diversification shall be carried out by applying PDCA cycle.** Key for success of PDCA cycle is steady monitoring and action for improvement. Model procedure of activities for crop diversification in a certain sub-project area under JICA ODA Loan Project and their procedures in PDCA cycle is shown in the table below. The extension officers should carefully follow the procedure for implementation of activities.

Table 1.5 Model Procedure for Promotion of Crop Diversification in PDCA Cycle

Cycle	Topics	Subjects	JICA ODA Loan Project	
			PMU	PMC
Plan	DPR Preparation	Survey / Investigation / Designing - Water availability - Farmers consent - Survey / Investigation - Designing - Cost estimation - Construction schedule - Feasibility, BC ratio - Annual maintenance cost for KVA	DPMU/ BPMU To be prepared by BPMU or outsource	Assistance & Approval
		Current situation by seasons - Cultivated area by crops - Unit yield by crops - Crop budget by crops		
		Proposed situation by seasons - Area to be cultivated by crops - Unit yield by crops - Crop budget by crops		
	Annual plan for	Interest of farmers for vegetable farming	DPMU/	Assistance

Cycle	Topics	Subjects	JICA ODA Loan Project	
			PMU	PMC
	agricultural development	Preferable crops by seasons	BPMU	
		Annual increment - Area to be cultivated by seasons		
		- Unit yield by seasons		
		Current constraints and problems		
		Market rate		
		Marketing infrastructure		
	Annual plan for extension training of farmers	Training programs - Priority subjects - Timings & duration	BPMU	Assistance
		Demonstrations - Priority crops and subjects - Area and target yield by crops - Timing		
	Annual plan for monitoring and evaluation	Indicators - Crop status (area and production by crops) -Irrigation status (irrigation hours for LIS / TWIS, irrigation area for FIS) - Maintenance status (inspection, cleaning and repair) - KVA financial status (incomings / outgoings)	DPMU/ BPMU Community motivators	Assistance
		Tools - Monitoring sheet for crop cultivation (Season wise - Monitoring sheet for securing the sustainability of irrigation project (Monthly)		
Do	Construction of irrigation facilities	Preparation of construction schedule	BPMU	Assistance
		Selection of contractor		
		Construction supervision		
	Training of farmers including demonstration activities	Preparation of Action Plan		
		Preparation of Evaluation Report		
	O&M of irrigation facilities by farmers	Field support to KVA		
	Vegetable cultivation in sub-project areas by farmers	Technical support for farmers		
		Following good crop management practices		
Check	Monitoring & Evaluation	Construction - Progress of construction work - Quality of material	DPMU/ BPMU	Assistance
		Agricultural status		
		Irrigation status		
		Maintenance status		
		KVA financial status		
Act	Reflection to the further plans	Construction - Modification of construction schedule	DPMU/ BPMU	Assistance
		Agricultural activities - Modification of the CDP(ADP& ETP) based on the result of the monitoring & evaluation		

1.5 Activities for Crop Diversification to Farmers

In Section 1.4, we are focusing on procedures for crop diversification in sub-project areas of JICA ODA loan project. Meanwhile, it is sure that **key persons for promotion of crop diversification are beneficiary farmers** in each sub-project area. Several training programs and extension activities (daily support and communication with them) by extension officers are required to reinforce farmers' organization, to improve agricultural productivity, to maintain irrigation facilities properly, and so on. Therefore **close communication with farmers and proper training/extension activities must be indispensable and key factor** for the successful implementation of crop diversification activities. Major activities and timeframe for crop diversification to farmers are summarized in the table below. The extension officers should fully understand the necessary activities for farmers and support them carefully.

Table 1.6 Major Activities and Timeframe for Crop Diversification to Farmers by extension officers

Category	Before Construction	During Construction	After Construction
General	(1) Awareness campaign (2) Recruitment and Capacity development of community motivators	(1) Orientation and needs assessment (2) Recruitment and Capacity development of community motivators	(1) Orientation and needs assessment ofr farmers (2) Strengthening of research – extension – farmers linkages
Infrastructure Development	(1) Sharing and description of irrigation project proposal	(2) Participation for supervision of construction management	(1) Maintenance work
Water Management and Operation / Maintenance	(1) Formation and formalization of farmers group (2) Capacity development of farmers groups	(1) Capacity development of farmers groups	(1) Capacity development of farmers groups (2) Improvement of operation and maintenance of irrigation facilities (3) Improvement of water management for vegetable cultivation
Vegetable Farming and Post-harvest		(1) Awareness of farmers about vegetable cultivation (2) Visit to success stories / progressive farmers (3) Identification of crops and area (4) Promotion of preparation techniques (water saving, soil conservation, soil fertility, etc.) (5) Promotion of IPM (6) Improvement of food grain productivity (7) Promotion of post harvest techniques (8) Promotion of vegetable consumption	(1) Promotion of group activities (2) Promotion of farm management (3) Promotion of preparation techniques (water saving, soil conservation, soil fertility, etc.) (4) Improvement of farming practices for common vegetables (5) Improvement of farming practices for exotic vegetables (6) Introduction of cropping pattern arrangement (7) Promotion of IPM (8) Improvement of food grain productivity (9) Promotion of post harvest techniques
Self Help Group (SHG) Development	Formation & formalization of groups	(1) Capacity development of farmers groups	(1) Capacity development of farmers groups (2) Promotion of farm management (3) Promotion of post harvest techniques
Marketing		(1) Awareness about marketing of farm produce	(1) Dissemination of market information and other marketing knowledge (2) Promotion of sorting, grading, and packing (3) Promotion of group activities

Especially when you conduct training activities, in order to obtain high quality results, each training program should be carried out with applying PDCA (Plan – Do – Check – Act) cycle. Namely we create target for each training program before starting, and hence prepare an action plan to achieve that target. Further the actual result obtained from training program could be compared with a target. Difference between the two is monitored and reviewed. Therefore corrective measures are adopted if some disparity is there. The following cycle is required for implementation of training programs.

Table 1.7 Procedure of Implementation of Training Program

No.	Stage	Outputs	Responsibility	
			PMU	DoA
1.	Before Implementation of training program	Action Plan: To be prepared before implementation of training activities, based on needs of farmers as well as actual situation in fields	Core extension officers in Block PMUs	Extension officers in Block office
2.	Implementation of training program	Training Report: To be prepared after implementation of training program. It is proposed that outcome of training program be checked, applying evaluation sheet.	Core extension officers in District PMUs and Block PMUs	Field extension staff of Block offices
3.	Checking outputs obtained from the training program	Monitoring Sheet: Area and production should be monitored, applying monitoring sheet. Meanwhile, farmers' needs as well as constraints should be also monitored.	Core extension officers in District PMUs and Block PMUs	Field extension staff of Block offices
4.	Review of training programs as well as its outputs	Annual Plan in the following fiscal year: Annual plan should be formulated based on the needs obtained from farmers as well as monitoring sheets.	Senior officers and core extension officers of PMU as well as DoA	Project Director of ATMA

CHAPTER 2

THEMATIC GUIDELINES

2.1 Agricultural Extension

(1) Outline of Agricultural Extension Activities for Crop Diversification

Agricultural extension is a process or procedure to create situation that is conducive for learning or communicating with the farmers. Due to heterogeneity with respect to age, education, level of needs, socio economic status and values etc., the transfer of technology to farmers is very difficult and thus we have to adopt group methods like training of farmers, organization of field demonstrations, study tours etc. by which Extension Officers can communicate with a number of farmers at the same time.

In order to promote crop diversification, the use of Plan-Do-Check-Act (PDCA) cycle[2] can be considered as powerful and simple model for achieving continuous and lasting improvement to the problems and challenges of bringing more area under vegetable crops. The adoption of PDCA for the promotion of crop diversification will help in the identification and prioritization of following major issues.

- ✧ Major issues of development
- ✧ Identification of gaps
- ✧ Identification of farm opportunities
- ✧ Need assessment of farmers.
- ✧ Prioritization of needs.
- ✧ Preparation of site /village plans
- ✧ Capacity building of farmers
- ✧ Mid-term evaluations & corrections

The stages of PDCA cycle are:

Plan

Planning is the basis of all the other stages and involves the most detailed efforts. This stage comprises of:

a) Identifying the opportunities / constraints or the scope of improvement
b) Defining the root cause of problem
c) Investigating or analyzing the information that can help in drawing out the solutions.

Do

Do means "Try "or test. This stage is to identify possible solutions or interventions and choose among the solutions available for testing. Since doing is an experiment so it is normally carried out on a small scale to limit the risks associated with something new.

Check

Check means to study the actual results (measured & collected in DO), and

[2] Refer to the materials for PDCA training, in order to understand theory as well as general concept of PDCA cycle.

compare against the expected results (targets or goals from the PLAN), to ascertain any differences and analyzing whether it could be improved in any way. The purpose of checking is to follow up on what you have planned to accomplish and recommending the best solution for improvement.

Act

After the check process the improvement that has been made is implemented on a wider scale .However, the use of PDCA cycle does not necessarily stop here. For continuous improvement we need to go back to "Plan" phase (Step 1) to have a new modified plan keeping in view the success or failure.

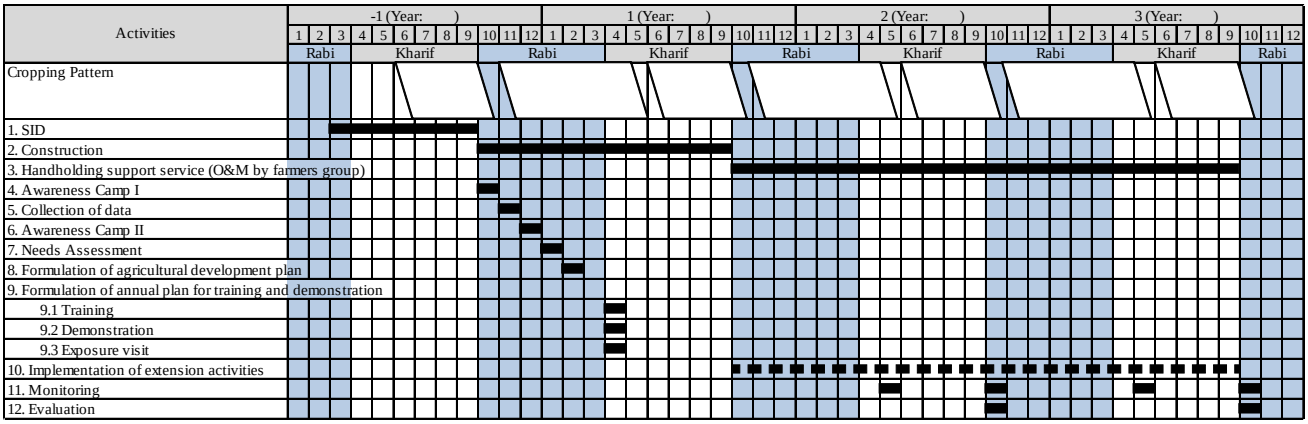


Fig. 2.1 Sample Time Schedule for Agricultural Extension Activities

(2) Planning for Agricultural Development and Extension Training Program (PLAN)

To bring desirable changes in the food crops (cereal) dominating cropping system towards high value vegetable crops, the Extension Officers have to motivate farmers for a change and ensure their participation in the planning and execution of the proposed interventions. In order to make any farmers' programs, it is essential that they must participate and own their programs.

For the promotion of crop diversification in the sub projects, the two most important activities are (i) preparation of agriculture development plan (ADP), and (ii) preparation of extension training plan (ETP), as components of the Crop Diversification Plan (CDP). This CDP could be prepared for all sub-projects by the PMU[3].

Training activities in the sub-projects will be carried out in sequence with the progress of the civil works.

In order to promote crop diversification and to measure the changes over a period of time, following activities are required to be undertaken:

1) Formulation of Agriculture Development Plan (ADP)

To harness the benefits of assured irrigation, the shift from food crops to vegetable cultivation has to be promoted in a phased manner keeping in view the resources available

[3] Refer to Updated Project Implementation Plan, October 2013, HPCDP

with the farmers and suitability of the area for the cultivation of these crops. The Extension Officer has to formulate agriculture development plan (ADP)of a particular sub project by following the steps given as under:

Table 2.1 Steps on Formulation of Agricultural Development Plan

Step	Activity	Purpose	When to arrange	Who will arrange	Participants
1	Awareness camp-I	i) To sensitize the community about the project goal & purpose, their roles, participation & responsibilities in different stages of project implementation. ii) To know about the interest of the farmers in crop diversification.	Before survey / investigation & start of construction work	Extension Officers and Site Engineer /Community Motivator	All farmers of the CCA
2	Collection of data of area, production & productivity of existing cropping situation	To know about the Existing situation regarding season wise & area wise different types of crops grown and their production in the CCA by collecting information through baseline survey or group discussion with farmers. Consequently annual agricultural development plan could be formed (Annexure 1.1)	After the Step1	Extension officer / Community Motivator	Progressive farmers
3	Awareness camp-II Preparation of Annual crop diversification plan	To prepare detailed crop wise plan about the yearly cropping pattern including the cultivation of high value vegetable crops by following the above criteria of number of farmers at the site and fixing the targets for next two-three years by giving rational increment per year. The yearly increment can be modified after the results of first year actual achievements and further discussion with the farmers. (Annexure 1.1)	Before completion of the construction work & successful trial run of irrigation scheme	Extension officers/ Community Motivator	All farmers of the CCA

Furthermore, it is strongly proposed to prepare "Implementation Schedule" by the PMU, and share it with the relevant farmers in sub-project, as shown in the formats of FM-16-07-P(3) as well as FM-16-07-P(4) in the Guidelines APRT-II. Farmers will be able to understand the suitable timing on farming practices. Meanwhile extension staff will be able to support farmers' activities as well as manage their training programmes.

2) Preparation of Extension Training Plan (ETP)

In order to motivate & educate a large number of farmers at one place and to

ensure diffusion of the useful available technologies to the notice of greater number of farmers, training camps and crop demonstrations regarding the scientific methods of crop cultivation are considered as most effective tools. Trainings are organized to bring change in the behavior focusing on continuous improvement in the processes or activities. To be result oriented, training must be based on the needs and interests of the learners and should deal with their real problem. List of training activities, which are required as support programs for farmers, are shown in Annexure 1.2. It is, however, not necessary to cover all activities for promotion of crop diversification everywhere. Training activities to be required for promotion of crop diversification could be selected, considering social as well as natural situations.

Demonstrations means showing by doing. The basic principal of demonstrations is learning by seeing and doing. These demonstrations should be conducted under the direct supervision of an extension worker, to prove the advantages of a recommended practice or practices.

To support and enhance the skills of the farmers of sub project areas it must be ensured that the extension trainings and crop demonstrations be planned in such a way that the Extension Officer should visit each sub project at least once a month for initial two years.(Annexure 1.2 showing training schedule for 2 years).

While organizing such events we have to consider the following steps at each sub-project area:

Table 2.2 Steps on Preparation of Annual Plan for Training and Demonstrations

Step	Activity	Purpose	When to arrange	Who will arrange	Participants
1	Need assessment	To know about the constraints in knowledge / experience in the cultivation of crops and counter measures to overcome (Annexure 1.3).	Before the start of crop season	Extension officers / Community Motivator	Farmers of CCA
2	Formulation of annual training summary	To plan about the subjects, schedule, venue, duration etc. of the training on the basis of needs of the trainees & changes desired. (Annexure 1.4), according to needs for farmers.	Immediate after the first step / before organizing the training	Extension officers / Community Motivator	Farmers of CCA
3	Selection of crop & focused area (practices) of demonstration	To have an idea about the skill /technique on which the demonstration is to be arranged (Annexure 1.5), according to needs for farmers.	Before crop season	Extension officers / Community Motivator	Farmers group

Step	Activity	Purpose	When to arrange	Who will arrange	Participants
4	Planning for demonstration	To define the purpose of demonstration and select the farmer & plot to organize demonstration plot on such a location which is easily assessable to large number of farmers and make timely arrangements of required input support (Annexure 1.6), according to needs of farmers.	Before crop season	Extension officers / Community Motivator	Farmers of CCA
5	Planning for Exposure Visits to success stories	To take the farmers to the success stories for interaction with the farmers who are already following such practices successfully. (Annexure 1.7)	During the crop season	Extension Officer / Community Motivator	Progressive farmers

(3) Implementation of Extension Activities (DO)

Since in most of the sub projects the vegetable cultivation will be new and the farmers have no experience of vegetable cultivation, the extension activities have to be executed in such a way that Agriculture Extension Staff could visit the sub project every month to guide the farmers and solve their problems. Model implementation schedule be prepared in a manner that some of the activities are undertaken before the construction, during the construction and after completion of the construction of the irrigation facilities depending upon the needs and contents of the extension activity. The sample for preparing Action Plan before arranging of extension training activities is given in the Annexure 1.8 and that of preparing Training Report is given in the Annexure 1.9.

Table 2.3 Steps on Implementation of Plans

Step	Activity	Purpose	When to arrange /Timing	Who will organize	Participants
1	Organizing training	i) To educate the farmers to adopt modern & scientific methods of production and to equip them with necessary skills & techniques. (Annexure 1.8). ii) To develop the training report (Annexure 1.9).	At critical stages of crop growth like: a. Before sowing of crop. b. Transplanting stage. c. Harvesting stage	Extension Officer	All farmers

Step	Activity	Purpose	When to arrange /Timing	Who will organize	Participants
2	Conducting demonstration	i) To popularize the crop production technologies on method & time of sowing, manuring & fertilization, weeds, irrigation, growth regulation practices, pest management harvesting, grading packaging etc. to large number of farmers in the sub-project area (Annexure 1.10). ii) to prepare the performance report of the demonstration plot (Annexure 1.10).	Sowing time	Extension officer / Community Motivator	All Farmers
3	Arranging Field Day at site	To create awareness and sharing of results /benefits with the farmers of the area. (Annexure 1.11).	At crop maturity / harvest time	Extension officers / Community Motivator	All farmers
4	Arranging Exposure Visit	To sensitize and show the farmers about the practices being followed by the farmers of advance area .(Annexure 1.12)	At crop growing stage	Extension Officers	Progressive farmers

(4) Monitoring of Extension Activities (CHECK)

To assess the change in the cropping system, the Extension Officer /Motivator will have to collect the information about the area, production and productivity per unit area of each crop at the end of the crop season so that the changes due to the adoption of new cropping system could be recorded (Annexure 1.1).For authenticity and correctness, this information should be collected individual farmer wise and crops wise, applying the format of Table 31 on Monitoring Sheet for Crop Cultivation, WM-01-01 of PART-II.The following steps should be followed for recording the changes:

Table 2.4 Steps on Monitoring

Step	Indicators	By whom to be checked	Stage of checking
1	Season /crop wise area cultivated	Extension Officer / Community Motivator	During crop season
2	Season /crop wise production	Extension Officer / Community Motivator	End of crop season
3	Per unit increase in yield	Extension Officer	End of crop season
4	Farmers observation about the new intervention	Extension Officer	During & end of crop season
5	No. of vegetable growers	Extension Officer / Community Motivator	During & end of crop season
6	Irrigation utilization (pumping hours)	Extension Officer / Community Motivator	During & end of crop season

(5) Evaluation of Extension Activities (ACT)

After discussion with the farmers of subproject about the performance of the

interventions made and tested regarding crop diversification and if are found beneficial, the same could be used on large scale to increase the area, production and productivity of particular cropping system (Annexure 1.1) and if the results are not encouraging we have to follow the PDCA cycle from stage 1(Plan) on the basis of needs and requirements from farmers and make the necessary corrections at all the stages. The below mentioned points be taken into consideration for acceptance / modification of the model adopted:

Table 2.5 Steps on Evaluation

Step	Indicators	By whom to be evaluated	Stage of evaluation
1	Increase in cropping intensity (Annexure 1.13)	Extension Officer	End of Year
2	Acceptability of the crop diversification model for replication by other farmers (Annexure 1.13).	Extension Officer	End of year
3	Clarification about needs & requirements for Extension activities (Annexure1.3), if necessary.	Extension Officer	End of year
4	Modification of annual plan for training & demonstration (Annexure 1.2) is necessary.	Block Project Manager	End of year
5	Modification / replication of agricultural development plan (Annexure 1.1), if necessary.	Block Project Manager	End of year

2.2 Infrastructure Development

Infrastructure development is one of the main activities for implementation of crop diversification project. The well-functioning infrastructure is fundamental for stable vegetable cultivation in beneficiary area. Outline of the process to develop infrastructures in a certain project area is summarized in the figure below:

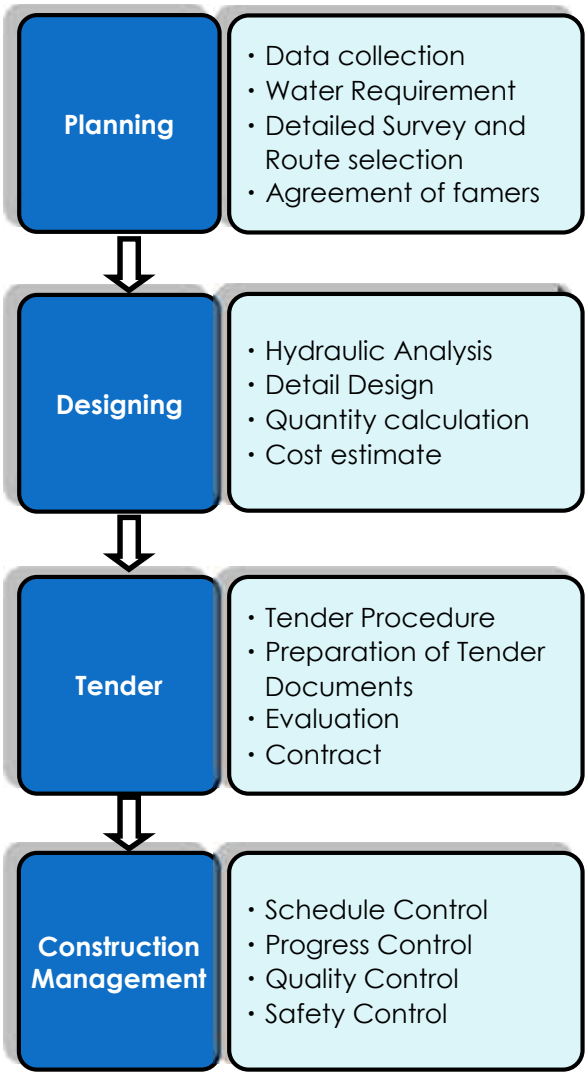


Fig. 2.2 Work Procedure for Infrastructure Development

(1) Planning

The first step of developing of irrigation facilities is "planning". In this stage, it is very important 1) to collect reliable data and information necessary for further steps, 2) to determine the most appropriate Cultivable Command Area (CCA), based on runoff of river and the water requirement, and also 3) to plan irrigation system based on the topographic survey results. In addition to this, to obtain agreement from farmers through enough explanation to them is also important aspect in this stage.

Data collection & field survey	
1) To collect data necessary for calculation of water requirement a) Temperature b) Humidity c) Sunshine d) Wind speed e) Cropping Pattern f) Land classification g) Rain fall (minimum Last year)	***Refer to*** ・ Watershed Management Guidelines for Indian Conditions, E.M. Tideman, GTZ ・ ENG-01-04
2) To measure lean period discharge (LPS) of river flow in project area	***Refer to*** ・ ENG-01-05
3) To collect data necessary for peak runoff discharge for intake weir a) Catchment area b) Length of nala c) Difference in Elevation to intake from start of nala d) Land classification (Ex. Hay land, Forest land) e) Rain fall (minimum Last year)	***Refer to*** ・ ENG-01-05 ・ ENG-01-06
4) To collect data necessary for detailed survey and route selection a) Flow and shape of the river b) Intention of residents around the intake c) Intake weir upstream facilities d) General planning drawing e) Longitudinal & Cross section drawing f) Farmers agreement	***Refer to*** ・ ENG-01-01 ・ ENG-01-02 ・ ENG-01-03 ・ ENG-01-05 ・ ENG-02-08
Key Points ・ It is important to collect reliable data from several sources to raise data precision. ・ It is recommended to measure LPS directly by triangular measuring weir. In case it is impossible to do so, LPS could be estimated from hearing from farmers or other villagers. ・ If it is impossible to collect runoff discharge, it can be estimated from hearing from farmers or checking flood marks in the site.	

Water requirement	
1) To calculate water requirement by using the data collected. **Blaney-Criddle method** is appropriate for estimation of water requirement. 2) To compare runoff discharge and water requirement obtained from the calculation 3) To decide irrigation area based on the result from comparison of discharge and water requirement	***Refer to*** ・ Crop evapotranspiration - Guidelines for computing crop water requirements - FAO Irrigation and drainage paper 56, R. G. Allan et al., 1998 ・ ENG-01-04
Key Points ・ If runoff is less than water requirement, it is necessary to reconsider beneficiary area.	

Detailed survey and route selection	
1) To carry out the survey for preparing general drawing 2) To determine tentatively canal and pipeline route, and location of the facilities. 3) To install pegs and marks of facilities and canal layout in the field 4) To make sure planning of construction area with farmers 5) To determine the final layout of canal and facilities 6) To draw longitudinal & cross section drawing based on the planning	***Refer to*** ・ ENG-01-05

Key Points

- These works are carried out in parallel.
- It is important to check contours in drawing map carefully.
- It is preferable to describe residential area, trees, existing facilities etc. in the drawings, because these obstacle become hindrance on route selection.
- To avoid as much as possible the installation of the water tank under a tree, because leaves fall in the tank.
- Flooding area in upstream of the weir should clearly show in the drawing to prevent damage for existing facilities.
- Distribution tank must be installed in the highest place in the CCA.
- Intake and sump well should be connected by the straight line as much as possible.
- Each route should be selected for avoiding residential area and trees etc. as much as possible. Border of the field is also suitable for canal line.
- After marking of pipeline and setting of structure, again explain to disputed farmers until they will agree.

Agreement of farmers	
1) To obtain **No Objection Certificate (NOC)** from all farmers before starting of construction work through explanation to them	***Refer to*** ・ No Objection Certificate (NOC) of Lahalri

Key Points

- It is recommended to conduct field survey with related farmers (land owners) to prevent claim from them after starting construction work.
- Community motivators shall be discussion channel between implementation agency and farmers

(2) Designing

Objective of designing work is 1) to prepare drawings for construction and 2) to calculate quantities of construction work, by using the results of investigation and surveying. Designing work is one of the most important steps for infrastructure development in order to achieve a flexible system, a good efficiency with low loss, an ease of use and maintenance. Careful attentions for designing work should be paid in every work by engineers. Necessary works at the designing stage is described below:

Hydraulic analysis	
【Requirement of data】 Longitudinal & Cross section drawing, Maximum water requirement 【For the case of open canal】 To determine the height and shape of the minimal cross-section canal which can safely afford maximum flow based on flow rate, flow velocity, height difference, the waterway length. For friction caused water flowing through the canal, the height of the channel is determined by adding the friction. **Manning formula** is used to calculate the friction loss. Various types head loss is calculated according to the longitudinal & cross section linear, to determine the total head loss from a variety of head loss and friction loss. Finally, it is checked whether a sufficient flow discharge. 【For the case of pipeline】 To determine the minimum pipe diameter which can safely afford maximum flow based on flow rate, flow velocity, height difference, the length of pipes.	***Refer to*** ・ Design Report of Lahalri pilot area, JICA-TCP ・ ENG-02-01 ・ ENG-02-02 ・ ENG-02-03 ・ ENG-02-05 ・ SE-01

Hazen-Williams formula is used for calculation of the friction loss. Various types head loss is calculated according to the longitudinal & cross section linear, to determine the total head loss from a variety of head loss and friction loss. Finally, it is checked whether a flow discharge and presser is sufficient or not.	

Key Points

- The results of the hydraulic calculation shall be summarized as **vertical hydraulic diagrams** and shall be listed in tables of height of the head, height of the surface water and height of canal bottom.
- In the case of canal, freeboard should be kept at 5-7% of water depth.
- Arrangement of pipeline should be linear as much as possible to reduce the curves of pipes.

Design of intake

Design procedure of intake (1) Determination of the type of weir (2) Determination of the height of weir. (3) To make sure the safety falling, sliding, of subsidence. (4) Determination of the length apron of water upstream would not go around	***Refer to*** ・ Design Report of Lahalri pilot area, JICA-TCP ・ Watershed Management Guidelines for Indian Conditions E.M., Tideman GTZ. ・ ENG-02-03 ・ SE-01

Key Points

- Tips on decision of intake height should be checked.
- **Intake height should be sufficient to avoid any flooding** of farm land.
- Intake height should be enough to ensure water requirement.
- CCA should be reduced, if water requirement is not sufficient.
- Base concrete is deposited, in order to construct structure precisely.
- In order to make the structure accurately, foundation concrete is pouring.

Design of pump house and equipment

Design of around pump house (1) Shape of feeder-canal and desilting chamber is determined in consideration of flow discharge, flow velocity, the height difference, etc. (2) Capacity of sump well is determined, considering a margin to some extent from the capacity of pump. (3) To determine capacity of pump equipment, considering total head and pumping amount.	***Refer to*** ・ Design Report of Lahalri pilot area, JICA-TCP ・ ENG-02-01 ・ ENG-02-02 ・ SE-01

Key Points

- It is better to ensure a certain width around pump, for maintenance.
- Electric power charge for more than 20kW is different.
- It is better to put a **sluice valve and non-return valve in the discharge side**.
- Two pump is preferable to consider risk management. Discharge of one pump is half of plan total discharge.
- Before **suction pipe, an equipment to remove garbage** should be installed.
- Base concrete is deposited, in order to construct structure precisely.
- In order to make the structure accurately, foundation concrete is pouring.

Design of canal and pipeline	
(1) **Structural calculation should be required** in addition to the hydraulic calculations. (2) Some losses should be considered so that irrigation water flows to the end of facilities.	***Refer to*** ・ Design Report of Lahalri pilot area, JICA-TCP ・ ENG-02-01 ・ ENG-02-02 ・ SE-01
Key Points ・ It is better **to place sand foundation** to prevent damage of the pipe. ・ Pipe thickness is required have a certain the margin. ・ It is better that the **pipe depth is more than 60cm** for preventing damage by plowing.	

Design of tank and outlet	
(1) When determining detailed location and size of the facilities, it is important to check whether it is easy to use or not for farmers. (2) Capacity of water tank should be decided based on the structure stability.	***Refer to*** ・ Design Report of Lahalri pilot area, JICA-TCP ・ ENG-02-01 ・ ENG-02-02 ・ SE-01
Key Points ・ When you determine the location and size of tanks and outlet, you should consider usage of water and maintenance of facilities. ・ Cover for preventing falls into the water tanks recommended to be installed. ・ In order to avoid unauthorized use, you should **install locks on the valve system**.	

Preparation of Drawings	
(1) To prepare drawings based on the results of the design. (2) The drawings are prepared for actual construction work and calculation of the work amount.	***Refer to*** ・ Design Report of Lahalri pilot area, JICA-TCP ・ ENG-02-06 ・ ENG-02-07 ・ SE-05 ・ SE-06
Key Points ・ You should **specify all of the necessary specification and information in the drawings** in order to pick up the quantity. ・ Line thickness between dimension lines and structure lines should be different. ・ Layer of dimension lines and structure lines should be separated.	

Quantity calculation	
(1) To pick up the quantity based of the drawings and the quantity of detailed analysis rates.	***Refer to*** ・ Analysis of Rate for Delhi 2007 (Reprint-2010) ・ SE-05 ・ SE-06
Key Points ・ **Rate for Delhi 2007(Reprint-2010) should be referred** for quantity calculation.	

Cost estimation

(1) To make a construction plan (detailed way of work) and a construction progress schedule (The period of the procedure of the construction work) before preparation of the abstract of cost and select the detail of cost table.

With the construction plan?

(2) To determine the machine used for construction (Concrete Mixer, etc.)

(3) To determine the transport material to site (Donkey or Laborer or Track)

(4) To determine the temporary work (Chute for pouring concrete, etc.)

(5) To determine the temporary stock yard for material (Requires agreement of farmers)

With the construction progress schedule?

(6)To calculate how many days you need to install the tank with reinforced concrete and pipeline, and to determine duration from start to completion of construction work, deciding the procedure of construction.

For example, how many days are required, in order to make the water tank with reinforced concrete**?**

- Excavation of setting place
- Cleaning of excavation place
- Poring to the base concrete
- Assemble the reinforcement
- Setting the formwork
- Poring to the concrete
- Removing the formwork
- Curing

} How many days**?**

(7) You can calculate the exact construction costs base on detail construction plan.

- To examine the necessary material.
- To determine unit price to be used, comparing market price and reference price.
- To prepare Bill of Quantity, applying unit price, analysis of rate, and drawings.
- To input the quantities to abstract of cost, to make cost estimate.

Refer to

- Analysis of Rate for Delhi 2007 (Reprint-2010)
- CPWD Specifications 2009
- CPWD Works Manual 2007
- ENG-02-04

Key Points

- It is important to estimate the cost based on the proper cost table.

(3) Tender

Executing agency is required to prepare the tender document, based on full understand of the detail of the contract, further it is also important role of executing agency to **manage tender process with accountability and fairness**.

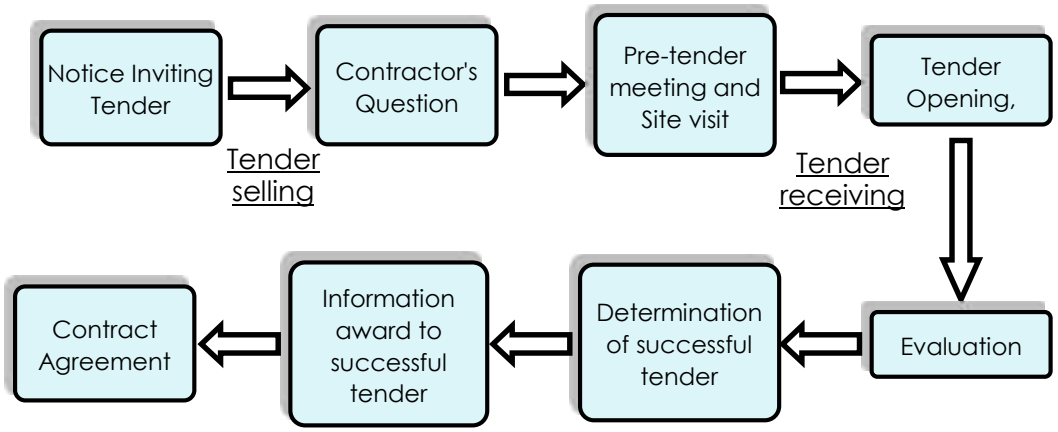


Fig. 2.3 Work Procedure for Tender

Tender procedure	
(1) Noticing Invitation of Tender to newspaper (2) Establishment of Tender committee (3)Tender opening (4) Evaluation by Tender committee (5) Determination of successful tender (6) Contract agreement	***Refer to*** ・ ENG-03-01 ・ ENG-03-04 ・ ENG-03-07 ・ ENG-03-08 ・ ENG-03-09 ・ ENG-03-10 ・ ENG-03-11 ・ ENG-03-12 ・ ENG-03-13 ・ ENG-03-14 ・ SE-09 ・ SE-10
Key Points ・Method of tender shall be **"two-envelope method"** with "technical proposal" and "financial proposal ".	

Preparation of tender documents	
Table of contents of tender documents should follow below: PART 1 Tendering Procedures Section I Instructions to Tenderers Section II Tender Data Sheet Section III Evaluation and Qualification Criteria Section IV Tender Forms Section V (not required) PART 2 Work Requirements Section VI Work Requirements Specifications; General, Technical Drawing PART 3 Condition of Contract and Contract Form Section VII Conditions of Contract Section VIII Contract Forms	***Refer to*** ・ Government of HP Irrigation & Public health department Percentage / Item rate Tender & Contract for works (up to Oct 2010) ・ Sample bidding documents under Japanese ODA Loans procurement of small works (sep. 2010) ・ Tender Document in TCP ・ ENG-03-02 ・ ENG-03-03 ・ ENG-03-20 to 26 ・ SE-03 ・ SE-04
Key Points ・ Tender qualification in case of JICA-TCP ・ To be registered in class A and B in I&PH /PWD Department ・ To produce registration certificate under H.P. ・ The list of works of the similar nature executed ・ The average annual turnover of the contractors	

Evaluation of tender	
Tenderers are evaluated in the following steps. 【STAGE1】 1. Bill of Quantities 2. Earnest Money 3. Technical Proposal 4. Tenderer's Qualification 【STAGE2】 1. Site Organization 2. Method Statement 3. Mobilization Schedule 4. Construction Schedule 5. Safety Plan 6. Personal 7. Equipment 【SATAGE3】 1. Tender price	***Refer to*** ・ ENG-03-13 ・ ENG-03-15 to 19 ・ SE-07 ・ SE-08

Contract	
The following items should be required to be included in the contract agreement. 1. Construction Period 2. Inspection Method 3. Payment Method 4. Penalty 5. Defect liability Period 6. Return method of deposit money	***Refer to*** ・ Government of HP Irrigation & Public health department Percentage / Item rate Tender & Contract for works (up to Oct 2010) ・ Sample bidding documents under Japanese ODA Loans procurement of small works (sep. 2010) ・ Tender Document in TCP ・ ENG-03-02 ・ ENG-03-03 ・ ENG-03-20 to 26 ・ SE-03 ・ SE-04

Key Points

・ Followings are checked carefully:
・ 1. The duty of contractor should be completely described in Terms of Reference. For example, making of construction schedule and setting of mile stone, designation of supplier of aggregate etc.
・ 2. Details of test methods such as material inspection, site inspections, and final inspection are specified.
・ 3. It is specified that **payment will be carried out after passing inspection** in the field by the Engineer in charge.
・ 4. It is specified that a penalty is required, considering delay of construction work.
・ 5. Defect liability period includes the rainy season.

(4) Construction Management

The most important issues in the construction management are to properly control the four elements, namely **1) Schedule, 2) Progress, 3) Quality and 4) Safety**. The role of implementation agency is to manage the work of contractor based on the four elements.

Before the construction, the contractor prepares a construction plan. The construction plan is a document for carrying out the construction work safely and economically. Based on the construction plan, you should carefully manage the construction work of contractor. The details are shown in the following figure.

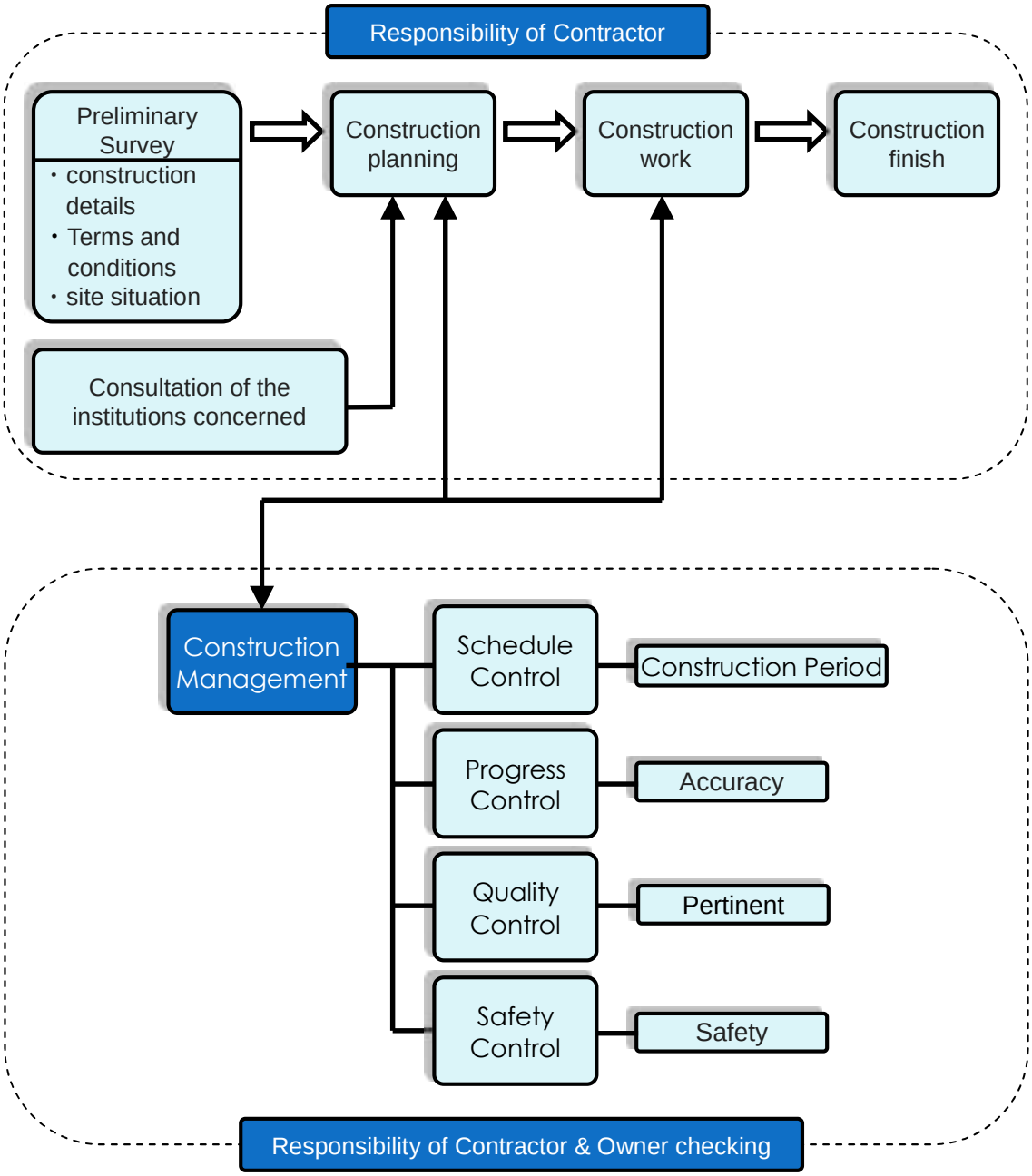


Fig. 2.4 Breakdown of Construction Control

Construction management	
(1) It is recommended to carry out the weekly meeting with contractor for close communication with the contractor.	***Refer to*** ・ ENG-04-01 to ENG-04-31

Key Points

・Check List for Weekly Meeting

1. Confirmation of construction progress of this week.
   - 1.1 Construction progress report
   - 1.2 Report on problems (Such as disaster and land issues)
2. Confirmation of the construction process of the next week
   - 2.1 Confirmation of the transport material in the site such as material name (sand, gravel, cement, pipe, construction equipment), quantity, material loading method (Truck, donkey, people), carry-date, etc.
   - 2.2 Work confirmation of each work such as transport of construction equipment (temporary pump, concrete mixer, welder), the number of workers, work detail, etc.
3. Inspection item of the next week, Inspection date
4. Schedule of the payment of the next week
5. Report, notice, advice from the Implementation agency.

Schedule control	
・ You should guide the contractor to prepare a construction schedule before starting the construction. ・ At the kick-off meeting you should communicate with the contractor closely in order to have common understanding for the plan and processes of construction. ・ You should **verify differences between the construction progress and the plan** based on the construction progress sheet with a frequent site visit and try to remove a cause of the difference ・ It is important to note also related construction work other than construction work on irrigation facilities. ・ After completion of the construction work, it shall be confirmed that each facility is functioning well and irrigation water reaches to the end by **carrying out a test run immediately**. If there is a defect such as a water leak, repair work should be done by the contractor. ・ If defects or inconvenience in irrigation facilities occurred during the defect liability period, the contractor should be immediately required to repair it.	***Refer to*** ・ ENG-04-01 to ENG-04-31

Key Points

・ In case of lift irrigation, it is instructed that the installation procedure of electricity should be started just at the commencement of construction work for preventing delay of the work due to the installation of electricity.
・ It is important to **hold the meeting with the contractor at least once a week**, to have a common understanding about the construction progress.
・ Implementation agency should confirm the breakdown of construction plans to be submitted by the contractor. And, it is important to recognize the work specification.
・ In the meeting, it is necessary that staff in charge, who is capable of decision-making.
・ It is instructed to watch out disputes with farmers regarding land issue.
・ To **check the physical progress of work at the site**.
・ Completion Certificate shall be issued to contractor after the end of the defect liability period.

Progress control	
・ Monthly payment will be done after site inspection and approval of Implementation agency. Site inspection is carried out by direct-measurement. ・ Payment will be done in complete volume of once a month. ・ Progress control is carried out with photographic record, in order to carry out quality control and payment to contractor as well. ・ Final payment will be done quickly, after test run and final	***Refer to*** ・ ENG-04-31 ・ SE-11

inspection. ・ Deposit money is released after the end of the defect liability period.	

Key Points

- Site inspection shall be carried out together with the person in charge of contractor in the field. **Both sides confirm work quantity based on the measurement book** prepared by the contractor and sign on. This is the evidence of payment.
- Payment to the contractor shall be done quickly.

Quality control	
・ **Quality control is carried out at the site by implementation agency and contractor together**. ・ Quality control is shared with the contractor in the meeting ・ Before proceeding to the next step, contractor is required to contact to engineer in charge, and to receive his site inspection. ・ To monitor strictly quality and quantity of materials such as sand, gravel, cement, pipe, etc.) at the site	***Refer to*** ・ ENG-04-31 ・ SE-11

Key Points

<Quality control for concrete work>

- **Mixing concrete test** is required to be performed early in the start of construction, also its test results are provided to the supplier.
- **Material inspection** is carried out before carrying-in of materials such as sand, gravels, etc.
- To check the element dimensions, reinforcing bar spacing, the reinforce cover thickness at the stage of formwork installation.
- Strict **curing** is required after removed the formwork.
- To check the concrete combination **using violator** is recommended during the poring the concrete
- Before construction starts and during construction period, **cube-test** is recommended.
- Reinforcement is provided in the through portion of concrete.
- Concrete poring in rainy day is not proposed.
-

<Quality control for earth work>

- **Compaction of soil** backfill is indispensable.
- If not compacted, some embankment is required, considering settling.
- Temporarily place should be arranged for excavated soil.
- **Sandbags for prevent erosion** is required for backfill of field boundary.
-

<Quality control for pipelines & canals>

- To do **factory inspection** prior to mobilizing ready-made products to the site.
- To conduct a **material inspection** for those products on arriving at the site.
- Material inspection certificate is required to be issued.
- To check the depth of sand base.
- Water leak is checked before backfilling.
- To set water stop at the joint point of the open channel.

<Quality control for pump equipment>

- To check specifications of motor and pump before installation.
- To check a horizontal situation of the base for installation of equipment.
- To consider how to do the performance test of the pump after installation and its implementation period.
- To adjust height of panel of the electric equipment for easy operation.
- To arrange a space for management between the pump equipment and electrical panel.
- To settle a fence around a pump house.
- To show operation method of pump in the pump house.

Safety control	
・ To ensure the **safety of work employees as well as third party**. ・ To pick out dangerous spots in the site. ・ To assume an accident, and to remove its danger	***Refer to*** ・ ENG-04-31
Key Points ・ In case of deep excavation, to set fall prevention fence. ・ In case of excavation, which is crossing road (footpath), it is necessary to provide a temporary road or bridges. ・ At the end of daily construction work, cleaning and organizing of the work place are required. ・ At the end of daily construction work, it is required to pull tools as well as materials together. ・ To be well-known dangerous place to work employees as well as third party.	

2.3 Water Management and O&M of Irrigation Facilities

(1) Outline of Water Management and Operation & Maintenance for Crop Diversification

To develop and utilize the irrigation facilities efficiently, the **role of Water Users' Association (WUA) is important and essential** since the WUA shall be an owner of the facilities. If WUA doesn't function well, farmers will not be able to share irrigation water properly and also not be able to collect enough water tariff for pumping cost or repairing cost of the facilities. That is to say, malfunction of WUA means the failure of crop diversification. Therefore the extension officers need to strengthen WUAs for their sustainability, and activities needed to strengthen WUA are classified under the general term of "Water Management and Operation & Maintenance (O&M)".

Water Management and O&M of irrigation facilities **requires integrated knowledge** related to agricultural engineering, agriculture and also institutional development. In order to ensure sustainability of irrigation system for promotion of crop diversification, the major activities to be carried out in the field of Water Management and O&M are as follows.

1) Establishment of Water Users Association (WUA),
2) Planning and decision making on the suitable water distribution method and the water tariff
3) Operation of irrigation facilities based on the water distribution method
4) Proper maintenance of the irrigation facilities to prevent the early deterioration of the facilities.

The knowledge needed for the above mentioned activities are shown in the following Figure.

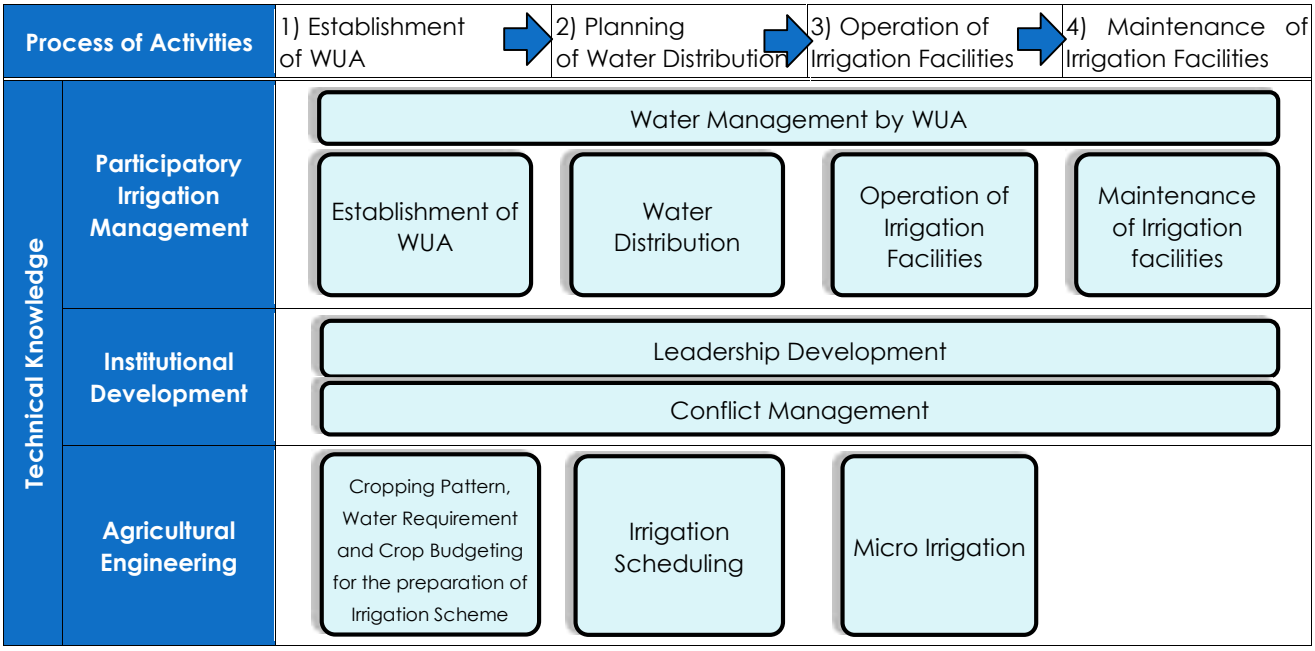


Fig 2.5 Technical Skills to be Needed for Activities of Water Management and O&M

As shown in the above Figure 2.5, "Water Management by WUA" is the knowledge necessary for all the four activities of WUA. And, "Establishment of WUA", "Water Distribution", "Operation of Irrigation Facilities" and "Maintenance of Irrigation Facilities" are individually needed for each activity (activity1, 2, 3, and 4) respectively. "Leadership Development" and "Conflict Management" are also the knowledge needed for strengthening the sustainability of WUA. On the other hand, "Cropping Pattern, Water Requirement and Crop Budgeting for the preparation of Irrigation Scheme" is needed for planning the irrigation project. "Irrigation scheduling" should be considered when the water distribution is planned for each project. "Micro Irrigation" is needed for operating the irrigation facilities at the on-farm level.

The extension officers shall need to master the technical knowledge and promote crop diversification following the process of activities mentioned above. The manuals/guidelines corresponding to each subject of technical knowledge can be referred to "PART II MANUALS/FORMS/STANDARDS". From the next section, detail process of each activities and attention to be made are described.

(2) Establishment of Water Users' Association

To promote crop diversification, farmers need to manage/maintain irrigation facilities by themselves with joint effort/cooperation. Therefore it is one of the most important activities for the extension officers to establish WUA which will be entity managing/maintaining irrigation facilities. In many countries, it is reported that WUAs are not functioning well because of lack of ownership. The extension officers need to repeatedly tell farmers that 1) owner of the irrigation facilities is not government but WUA/farmers and 2) WUA/farmers can get fruits from irrigation with duties to manage/maintain irrigation facilities by themselves. In addition, the extension officers need to support WUA to strengthen their sustainability each time. Process of activities for establishment of WUA is as follows.

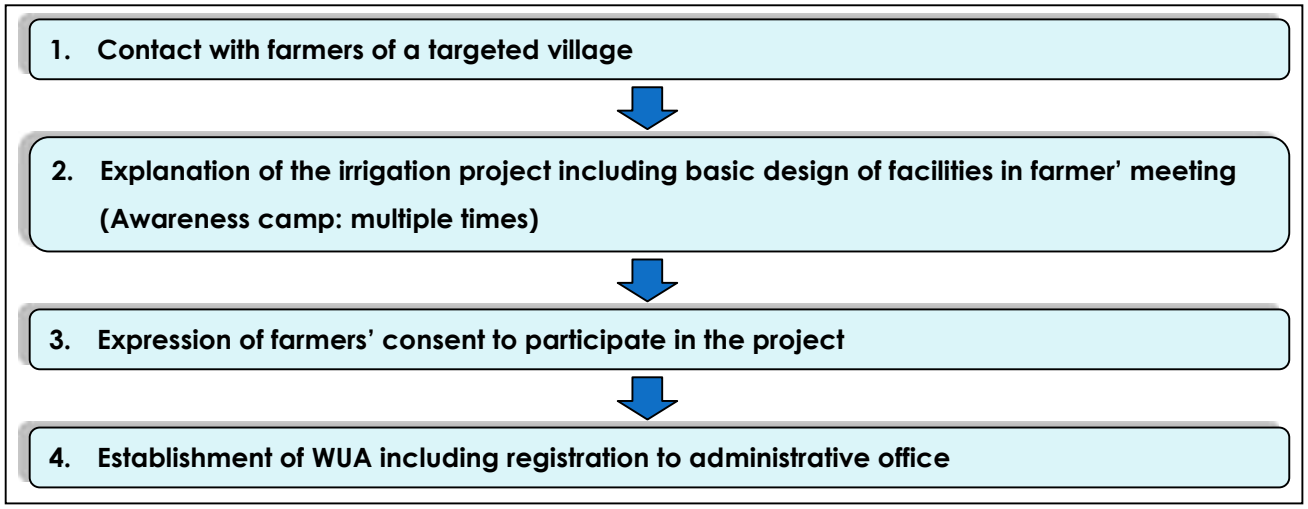


Fig. 2.6 Process of Establishment of WUA

Contact with farmers	
1) The extension officers need to access influential persons of a village through Panchayat or Municipality and explain the outline of the irrigation project. 2) After that, the extension officers can request the influential persons to have farmers' meeting for explanation of the project.	***Refer to*** ・ Water Management by WUA (WM-01-01, 01-02, 01-03), ・ Establishment of WUA (WM-02-01, 02-02, 02-03, 02-04, 02-05)
Key Points ・ To enhance ownership of farmers, the extension officers should request the influential persons to let a lot of farmers come to the farmers' meeting for explanation of the project.	

Explanation of irrigation project	
1) In awareness camp, extension officers need to explain the outline of the irrigation project. 2) the extension officers should explain a) outline of the project, b) owner of the irrigation facilities will be water users association after handing over the irrigation facilities, c) owner of the irrigation facilities have not only rights to use irrigation but also duties to manage the irrigation facilities and d) farmers need to signify their agreement to implement the irrigation project. 3) To let farmers learn the basic knowledge of WUA, the extension officers need to give a lecture based on the "Guidelines for water management by WUA". 4) To get the agreement of the famers, the extension officers can request farmers to have next farmers' meeting.	***Refer to*** ・ Water Management by WUA (WM-01-01, 01-02, 01-03), ・ Establishment of WUA (WM-02-01, 02-02, 02-03, 02-04, 02-05)
Key Points ・ The extension officers should explain not only the merit of the irrigation project but also the demerit of the project (Accountability, securing transparency).	

Expression of farmers' consent	
1) In the farmers' meeting, the extension officers need to get the agreement of farmers to participate in the irrigation project. 2) The agreement will be signed by each farmer and the record will be kept. 3) The extension officers can get actual agreement (/signature) of each farmer before the farmers' meeting through the influential persons. Therefore the farmers' meeting will function as a ceremony of deciding implementation of the irrigation project. 4) It is desirable that the extension officers will get 100 percent of farmers of agreement in the project area. Minimum will be above 90 percent.	***Refer to*** ・ Water Management by WUA (WM-01-01, 01-02, 01-03), ・ Establishment of WUA (WM-02-01, 02-02, 02-03)
Key Points ・ The extension officers should emphasis again that owner of the project will be each farmer and let farmers recognize that they own their duties to get the merit of the irrigation project. ・ If the number of agreements is less, farmers' meeting can be held multiple times and questions from farmers will be answered politely.	

Establishment of WUA	
1) After getting farmers' agreement, the extension officers can start to establish the WUA. 2) To let farmers learn on establishment and registration of WUA, the extension officers need to give a lecture based on the "Formation and Registration of WUA". 3) Farmers need to decide important post (Head, treasurer, members of Management Committee (MC), and community motivator), amount of monthly contribution and others. After that, documents needed will be submitted to administrative office. 4) After the establishment of WUA, management of WUA will be done in MC meeting. And important items need to be approved by General Body (GB) meeting. Therefore persons who are contacted by the extension officers are MC member or Community Motivator.	***Refer to*** ・ Water Management by WUA (WM-01-01, 01-02, 01-03), ・ Establishment of WUA (WM-02-01, 02-02, 02-03, 02-04, 02-05)
Key Points ・ If there are sub-groups who are opposing each other due to political or other reasons, posts of executives should be well balanced in consideration of each group.	

(3) Planning of Water Distribution

To promote crop diversification, irrigation water needs to be delivered properly in the project area. Rule of water distribution needs to be decided by WUA. But in most case, WUA doesn't have knowledge or experience of water distribution. Therefore the extension officers need to support WUA to decide water distribution method in the project area. The extension officers also need to support WUA to decide amount of water tariff and method of collecting water tariff based on the water distribution method decided. Process of activities for planning of water distribution is as follows.

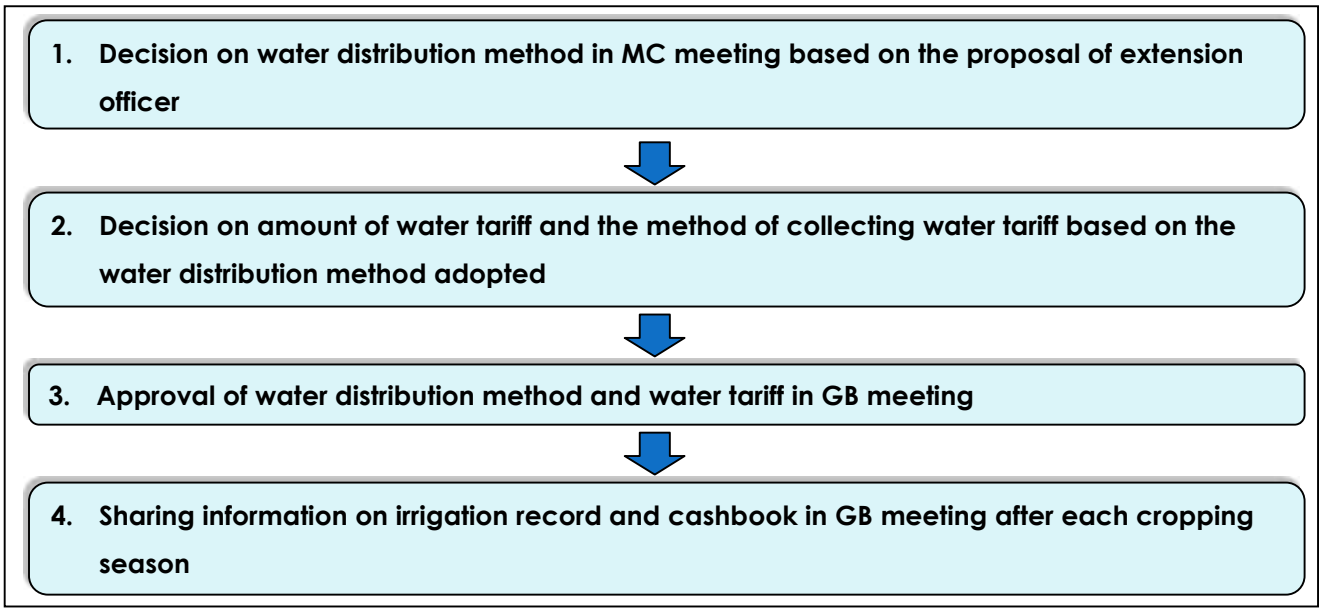


Fig. 2.7 Process of Planning of Water Distribution

Decision on water distribution method in MC meeting	
1) The extension officers can request MC to have MC meeting and method of water distribution will be discussed and decided. 2) To let farmers learn the basic knowledge of water distribution, the extension officers need to give a lecture based on the "Guidelines for water distribution". 3) After the lecture, the extension officers should propose the proper method of water distribution in the site. 4) Based on the lecture and proposal, MC members will discuss and decide water distribution method finally.	***Refer to*** ・ Water distribution (WM-03-01, 03-02, 03-03), ・ Water management by WUA (WM-01-01, 01-02, 01-03)
Key Points ・ The extension officers should discuss with WUA about water distribution method considering merits and demerits of each system. ・ WUA may sometimes deny the proposal of the extension officers about water distribution. Even in that case, you should respect the decision of WUA to strengthen the ownership of WUA.	

Decision on water tariff	
1) In the MC meeting, MC member also need to discuss and decide amount of water tariff and its' collecting method. 2) To let farmers learn the basic knowledge of water tariff, the extension officers need to give a lecture based on the "Guidelines for water management by WUA - Chapter 3 O&M Cost/Water tariff". 3) After the lecture, the extension officers should propose the proper amount of water tariff and its' collecting method. 4) Based on the lecture and proposal, MC members will discuss and decide amount of water tariff and its' collecting method finally.	***Refer to*** ・ Water distribution (WM-03-01, 03-02, 03-03), ・ Water management by WUA (WM-01-01, 01-02, 01-03)
Key Points ・ WUA may sometimes deny the proposal of the extension officers about water tariff. Even in that case, you should respect the decision of WUA to strengthen the ownership of WUA.	

Approval of water distribution in GB meeting	
1) The extension officers can request MC to have GB meeting. 2) In the GB meeting, MC members are expected to explain the method of water distribution and water tariff, and the contents should be approved by GB members. 3) The extension officer should support MC members depending on the needs. 4) Contents approved in GB meeting need to be noted in the proceeding record.	***Refer to*** ・ Water distribution (WM-03-01, 03-02, 03-03), ・ Water management by WUA (WM-01-01, 01-02, 01-03)
Key Points ・ Explanation to GB members should be done slowly and politely so that all the farmers understand the contents discussed in MC meeting.	

Sharing information on irrigation record and cashbook in GB meeting	
1) All the records of water distribution and water tariff need to be kept in the book by the person in charge. 2) The records of water distribution and water tariff need to be shared to all the farmers in GB meeting periodically.	***Refer to*** ・ Water distribution (WM-03-01, 03-02, 03-03), ・ Water management by WUA (WM-01-01, 01-02, 01-03)
Key Points ・ The extension officers should provide a training on record keeping of water distribution and water tariff. ・ The extension officers can refer to "Guidelines for water management by WUA - Chapter 4 Record Keeping".	

(4) Operation of Irrigation Facilities

After decision of water distribution method/rule, operation of irrigation facilities is needed to deliver water based on the water distribution method decided. The extension officers need to support WUA to operate irrigation facilities properly. Especially you need to monitor the operation status in the field because improper operation can result in faster depreciation of the irrigation facilities or mechanical damage. Process of activities for operation of irrigation facilities is as follows.

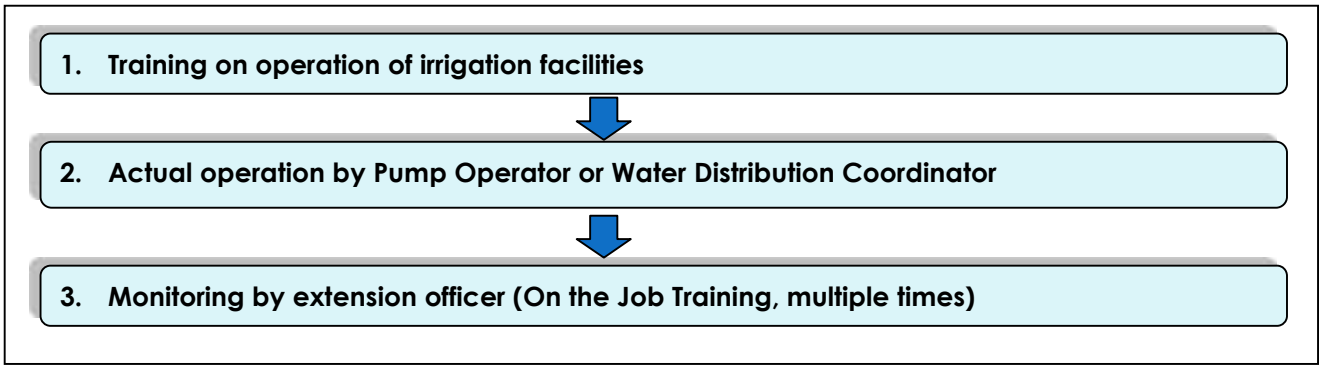


Fig. 2.8 Operation of Irrigation Facilities

Training on operation of irrigation facilities	
1) To let farmers learn the basic knowledge of operation of irrigation facilities, the extension officers need to give a lecture to a person in charge of operating irrigation facilities (Pump Operator or the other) and MC members based on the "Guidelines for operation of irrigation facilities". 2) After the lecture, the extension officers should provide field training for operation of irrigation facilities.	***Refer to*** ・ Operation of irrigation facilities (WM-04-01, 04-02)
Key Points ・ Installation agents or repair agents have enough knowledge for operation of pump, gates and valves. Therefore it is also good to ask them to be lecturers.	

Actual operation by Pump Operator or others	
1) Based on the lecture and field training, the person in charge of operating irrigation facilities (Pump Operator or the other) operates irrigation facilities actually and provides irrigation water to farmers based on the water distribution method decided before. 2) When the person in charge of operating irrigation facilities has in trouble with operation, he can discuss with MC members and Community Motivator (CM). 3) If they cannot solve the problem, CM can ask the extension officers though the mobile phone.	***Refer to*** ・ Operation of irrigation facilities (WM-04-01, 04-02)
Key Points ・ If there are many problems, the extension officers should visit the project site, check the problems and provide the training again to concerned persons and others.	

Monitoring by the extension officers	
1) The extension officers should check the latest situation of operation through field visit or mobile phone every month. 2) It is better to visit the site and have a direct communication with the person in charge of operating of irrigation facilities and CM.	***Refer to*** ・ Operation of irrigation facilities (WM-04-01, 04-02)
Key Points ・ The extension officers should give advices on an equal footing to be relied on by farmers.	

(5) Maintenance of Irrigation Facilities

Irrigation facilities can be depreciated faster without proper maintenance. Therefore irrigation facilities need to be maintained properly by WUA to promote crop diversification sustainably. The extension officers need to repeatedly tell farmers the importance of maintenance and cleaning from the early stage of the irrigation project and implant habits of periodical maintenance and cleaning in farmers. Process of activities for maintenance of irrigation facilities is as follows.

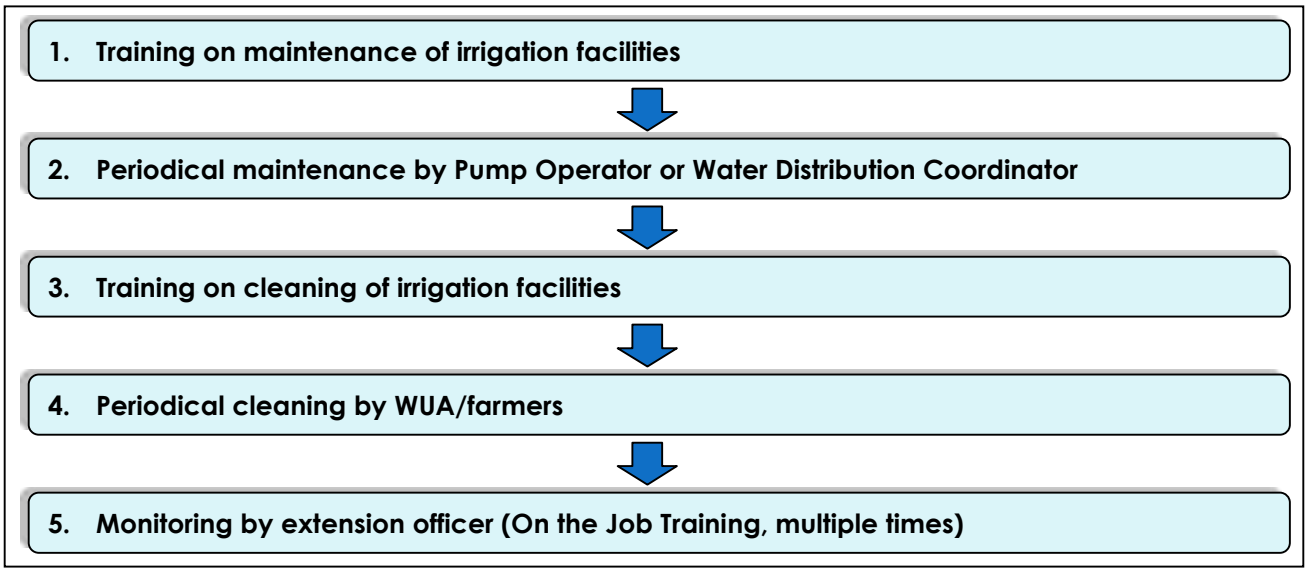


Fig. 2.9 Maintenance of Irrigation Facilities

Training on maintenance of irrigation facilities	
1) To let farmers learn the basic knowledge of maintenance of irrigation facilities, the extension officers need to give a lecture to a person in charge of operating irrigation facilities (Pump Operator or the other) and MC members based on the "Guidelines for maintenance of irrigation facilities". 2) After the lecture, the extension officers should provide field training for maintenance of irrigation facilities. 3) Maintenance record needs to be kept by the person in charge of operating irrigation facilities.	***Refer to*** ・ Maintenance of irrigation facilities (WM-05-01, 05-02)
Key Points ・ Installation agents or repair agents have enough knowledge for maintenance of pump, gates and valves. Therefore it is also good to ask them to be lecturers. ・ The extension officers can refer to "Guidelines on water management by WUA - Chapter 4 Record Keeping".	

Periodical maintenance by Pump Operator or others	
1) Based on the lecture and field training, the person in charge of maintaining irrigation facilities (Pump Operator or the other) maintains (/inspects) irrigation facilities periodically. 2) When the person in charge of operating irrigation facilities has in trouble with maintenance, he will discuss with MC members and Community Motivator (CM). 3) If they cannot solve the problem, CM can ask the extension officers though the mobile phone.	***Refer to*** ・ Maintenance of irrigation facilities (WM-05-01, 05-02)
Key Points ・ If there are many problems, the extension officers should visit the project site, check the problems and provide the training again to concerned persons and others.	

Training on cleaning of irrigation facilities	
1) To let farmers learn the basic knowledge of cleaning of irrigation facilities, the extension officers need to provide field training on cleaning of irrigation facilities to farmers based on the "Guidelines for maintenance of irrigation facilities". 2) Record of cleaning activities needs be kept by the person in charge.	***Refer to*** ・ Maintenance of irrigation facilities (WM-05-01, 05-02)
Key Points ・ It is very important to let many farmers involved in the cleaning training to strengthen ownership of the irrigation facilities and unity of the project area.	

Periodical cleaning of irrigation facilities	
1) Based on the cleaning training, cleaning will be done periodically. 2) Planning of cleaning activities should be done by MC.	***Refer to*** ・ Maintenance of irrigation facilities (WM-05-01, 05-02)
Key Points ・ It is very important to let many farmers involved in the cleaning activities to strengthen ownership of the irrigation facilities and unity of the project area.	

Monitoring by the extension officers	
1) The extension officers should check the latest situation of maintenance and cleaning of irrigation facilities through field visit or mobile phone every month. 2) It is better to visit the site and have a direct communication with the person in charge of maintenance of irrigation facilities and CM (Community Motivator).	***Refer to*** ・ Leadership development (WM-06-01) ・ Conflict Management (WM-07-01, 07-02, 07-03)
Key Points ・ The extension officers should give advices on an equal footing to have true reliance from farmers. ・ If number of participants to cleaning activities is less, the extension officers should plan the training on leadership management or other institutional training and let farmers discuss the problem in the training.	

(6) Gender & Social Inclusion in Water Management and Operation & Maintenance

According to the guidelines for WUA regulated by the DoA (WM-01-05), membership of WUA is limited to land owners, which in most cases are male household head. This automatically excludes women from membership. In consideration of importance of role of women in cultivation activities, women's participation in decision making should be assured.

- ✓ All women (whose husbands/ sons/ fathers are members), shall automatically become joint member of WUA.
- ✓ Only one vote shall be considered from each household and first voting right shall be given to women in case of dispute.
- ✓ Of the total members of the Management Committee, 1/3rd shall be women.
- ✓ In terms of social inclusion, at least one member shall be from Scheduled Caste/ Other Backward Class of the total members of the Management Committee.

These additional rules are specified in the guidelines prepared by JICA-TCP and PMU (WM-01-01 & WM-01-06), and therefore EOs are required to promote active participation of women and Scheduled Caste/ Other Backward Class. Possible arrangements include positive actions to invite them in meetings, providing opportunity for them to speak up, getting opinion from them who hesitate to speak up through community motivators.

2.4 Vegetable Farming and Post-harvest

(1) Knowledge and techniques for Vegetable Farming and Post-harvest

Knowledge and techniques about crop cultivation is the most important and indispensable for the extension officers in crop diversification activities. You should not only understand each technique by yourself and also learn how you disseminate them to farmers. Let us overview the technical knowledge to be needed for crop diversification activities in the following figure.

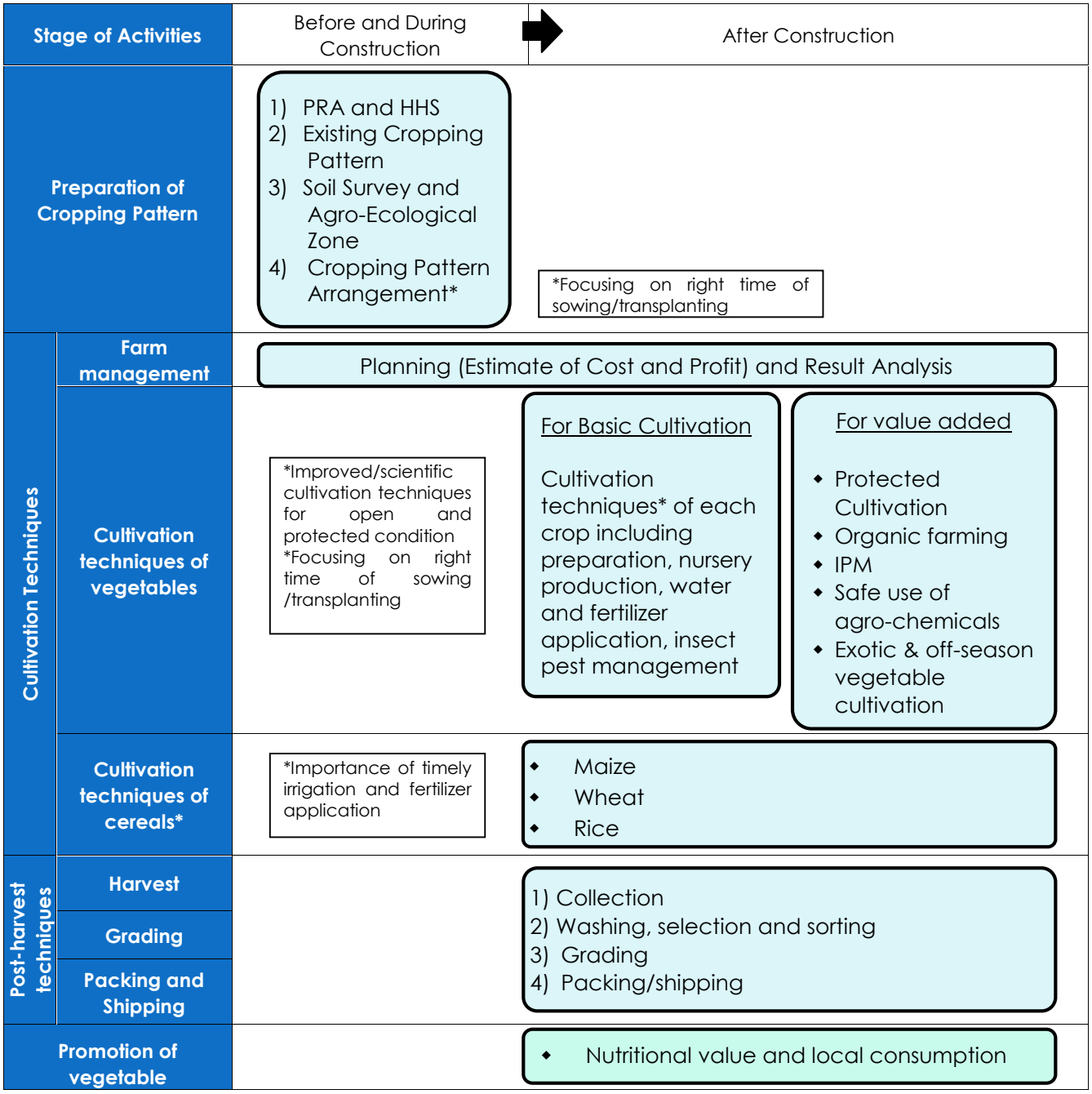


Fig.2.10 Technical Knowledge to be Needed for Activities of Vegetable Farming and Post-harvest

(2) Technical Manuals for Vegetable Farming and Post-harvest

In order to improve the technical knowledge of extension officers and further implement training activities for farmers in each sub-project area effectively and smoothly, technical manual as well as training materials for vegetable farming and post harvest are prepared. These manuals are divided into 3 components that is (1) preparation of cropping pattern, (2) cultivation techniques, and (3) post harvest techniques, as shown in PART-II MANUALS / FORMS / STANDARDS.

Extension officers should learn carefully these techniques and use them your actual field activities in the sites. Many frustrations are used in the manuals for easy understanding of actual techniques both for farmers and the extension officers. The manual for extension officers have tips in the red letters so that you can also understand how to disseminate the techniques to farmers. The manuals corresponding to each technique can be referred to "Farming and Post Harvest" of PART II. Manuals on each technique and their main contents are summarized below.

Cropping pattern arrangement	
1) Cropping pattern arrangement ・ PRA and HHS ・ Existing Cropping Pattern ・ Soil Survey and Agro-Ecological Zone ・ Cropping Pattern Arrangement	***Refer to*** FM-01-01-E ・ (Manual on Cropping Pattern Arrangement) ・ FM-01-01-P to 03-P (Training materials on Cropping Pattern Arrangement)

Farm management	
1) Book keeping ・ Basic skill and knowledge for keeping record ・ Items used for costs and profits **2) Budget making and monitoring** ・ Basic skill for making economic plan (budget) ・ Monitoring **3) Result analysis and planning** ・ Basic skill and knowledge for analyzing result ・ Reflection the result for next plan	***Refer to*** FM-02-01-E ・ (Manual on Farm Management) ・ FM-02-01-P to 02-P (Training materials on Farm Management)

Cultivation techniques of vegetables	
1) Land preparation ・ Field clearance and soil sanitation are important practices for prevention from soil and crop derived disease and insects ・ Tilling influences to growth of vegetables and cereals, and it results in the yield ・ Application of basal manure is indispensable to improve the yield. ・ Bed making provides root-sphere to spread roots and it results in good yield.	***Refer to*** ・ FM-03-01-E (Manual on Land Preparation and Sanitation)

Cultivation techniques of vegetables	
2) Nursery production ・ Nursery bed preparation ・ Clay block nursery ・ Tray sowing ・ Pot sowing ・ Plug tray sowing	***Refer to*** ・ FM-04-01-E to 05-E (Manual on Nursery Production) ・ FM-04-01-P to 03-P (Training material on Nursery Production and Management)
3) Cultivation techniques of vegetables ・ Tomato ・ Brinjal (eggplant) ・ Capsicum (Paprika) ・ Potato ・ Gourd Family (Cucumber, bottle and bitter gourd) ・ Okra ・ Peas and French beans including direct sowing ・ Cole vegetables (cauliflower, broccoli and cabbage) ・ Leafy vegetables (leaf lettuce, spinach and sarson) including direct sowing ・ Root vegetables (onion, garlic, ginger, turmeric, colocasia(taros), radish, carrot, turnip, elephant foot yam) including direct sowing ・ Condiments (fenugreek, coriander)	***Refer to*** ・ FM-05-01-E(1) to 12-E (2) ・ FM-08-01-E (1) to 14-E (2) (Manual on Cultivation Techniques of Vegetables) ・ FM-05-01-P to 08-P ・ FM-08-01-P to 03-P (Training Materials on Cultivation Techniques of Vegetables)
4) Water and fertilizer application ・ Sprinkler ・ Furrow irrigation ・ Manual irrigation ・ Drip irrigation	***Refer to*** ・ FM-17-01-E (Manual on Irrigation Methods) ・ FM-06-04-P ・ FM-06-07-P ・ FM-06-08-P (Training Materials on Irrigation Methods and balanced fertilizer use)

Cultivation techniques of cereals	
1) Maize ・ Land preparation ・ Sowing ・ Cultural practice including weeding and earthing up ・ On time application of water and fertilizer ・ Insects and disease control ・	***Refer to*** ・ FM-06-02-E (1) ・ FM-06-02-E (2) (Manual on Cultivation Techniques of Cereals, Maize) ・ FM-06-01-P ・ FM-06-03-P ・ FM-06-05-P (Training materials on Cultivation Techniques of Cereals, Maize)
2) Wheat ・ Land preparation ・ Sowing ・ Cultural practice including weeding ・ On time application of water and fertilizer ・ Insects and disease control	***Refer to*** ・ FM-09-01-E (1) & (2) (Manual on Cultivation Techniques of Cereals, Wheat) ・ FM-09-01-P (Training materials on Cultivation Techniques of Cereals)
3) Rice ・ Land preparation ・ Sowing ・ Cultural practice including weeding ・ On time application of water and fertilizer ・ Insects and disease control	***Refer to*** ・ FM-06-01-E (1)to (3) (Manual on Cultivation Techniques of Cereals, Rice) ・ FM-06-02-P ・ FM-06-05-P (Training materials on Cultivation Techniques of Cereals)

Value added cultivation	
1) Protected cultivation ・ Poly-house ・ Mist, tube and drip irrigation ・ Use of water soluble fertilizer ・ Pest and disease control in Poly-house ・ Use of shade net ・ Use of insect net ・ Use of poly-mulch	***Refer to*** ・ FM-11-01-E to 04-E (Manual on Protected Cultivation) ・ FM-11-01-P to 11-P (Training materials on Protected Cultivation)
2) Organic farming ・ Organic manure production including vermin compost ・ Organic liquid fertilizer production ・ Organic insecticide and fungicide	***Refer to*** ・ FM-14-01-E to 03-E (Manual on Organic Farming) ・ FM-14-01-P to 09-P (Training materials on Value Added Cultivation)
3) Exotic and off-season vegetable cultivation ・ Exotic vegetables (Snap Pea, Swiss Chard, Fava Bean, Celery, Brussels Sprout, Asparagus, Musk Melon in poly house, Musk Melon in open field, Trevise, Chinese cabbage ・ Techniques for improvement of exotic and off-season vegetables ・ Healthy nursery production ・ New techniques of grafting and cutting	***Refer to*** ・ FM-15-01-E to 12-E (Manual on Exotic vegetables) ・ FM-15-01-P to 16-P (Training materials on Exotic and off-season cultivation)
4) Integrated Pest Management (IPM) ・ Pest ・ Disease	***Refer to*** ・ FM-12-01-E & 02-E (Manual on IPM & IDM) ・ FM-12-01-P to 06-P (Training materials on Insect Pest and Disease Control)

Post-harvest techniques	
1) Right stage of harvesting ・ Ripening condition ・ Size	***Refer to*** ・ FM-07-01-E (Manual on Post-harvest Techniques) ・ FM-07-01-P to 11-P (Training material on Marketing and other Post-harvest Techniques)
2) Grading standards ・ Washing ・ Selection and sorting ・ Grading	***Refer to*** ・ FM-07-01-E (Manual on Post-harvest Techniques) ・ FM-07-01-P to 11-P (Training material on Marketing and other Post-harvest Techniques)
3) Right procedure of packing/shipping ・ Packaging and shipping ・ Storing	***Refer to*** ・ FM-07-01-E (Manual on Post-harvest Techniques) ・ FM-07-01-P to 11-P (Training material on Marketing and other Post-harvest Techniques)

Promotion of Vegetable	
1)Promotion of vegetable ・ Nutritional value of vegetable ・ How to combat chronicle diseases such as diabetes, high blood pressure and anemia	***Refer to*** ・ FM-16-01-E (Manual on Promotion of Vegetable ・ FM-16-01-P to 07-P (Training materials on Promotion of Vegetables)

2.5 Self Help Group (SHG) Development

2.5.1 Self Help Group (SHG) Development

(1) SHG Development for Crop Diversification

It is fundamental to understand purposes and significances of the components of SHG support in crop diversification project in Himachal Pradesh before conducting SHG related activities so as to provide effective supports on SHG to meet its purposes. Let us ask ourselves 'Why are the components of SHG development included in crop diversification project?' 'What are expected roles of the SHG activities in crop diversification?' We can consider the followings;

Examples of the purposes and significances of SHG development:

- To encourage processing of vegetables that have lower value in market as their own to be sold with higher value,
- To enhance productivity of concerned activities by taking advantage of working as a group and economy of scale (e.g. procurement as a group, provision of materials as a group, helping each other in cultivation, processing, packaging , marketing as a group),
- To encourage women to be involved in the economic activity not merely being agriculture workforce,
- To increase income of women (enable women to have cash that can be used with their own decision),
- To empower women, who are the major actors of the agriculture, by equipping them with management skills through group activities,
- To encourage and involve the marginalized from major agriculture activities due to the reasons such as lack of cultivation land, social status, less access to opportunities, and lack of affordability.

Keeping those purposes in our mind, necessary inputs to support and develop SHG activities can be identified.

(2) Work Management and Plan for SHG Related Activities

As a SHG is a small organization that is to be developed with its dynamism of members, their ability, and their activities, it is important to establish their capacity and organization step by step. The following chart shows basic development stages and project interventions in each stage along with the timeline.

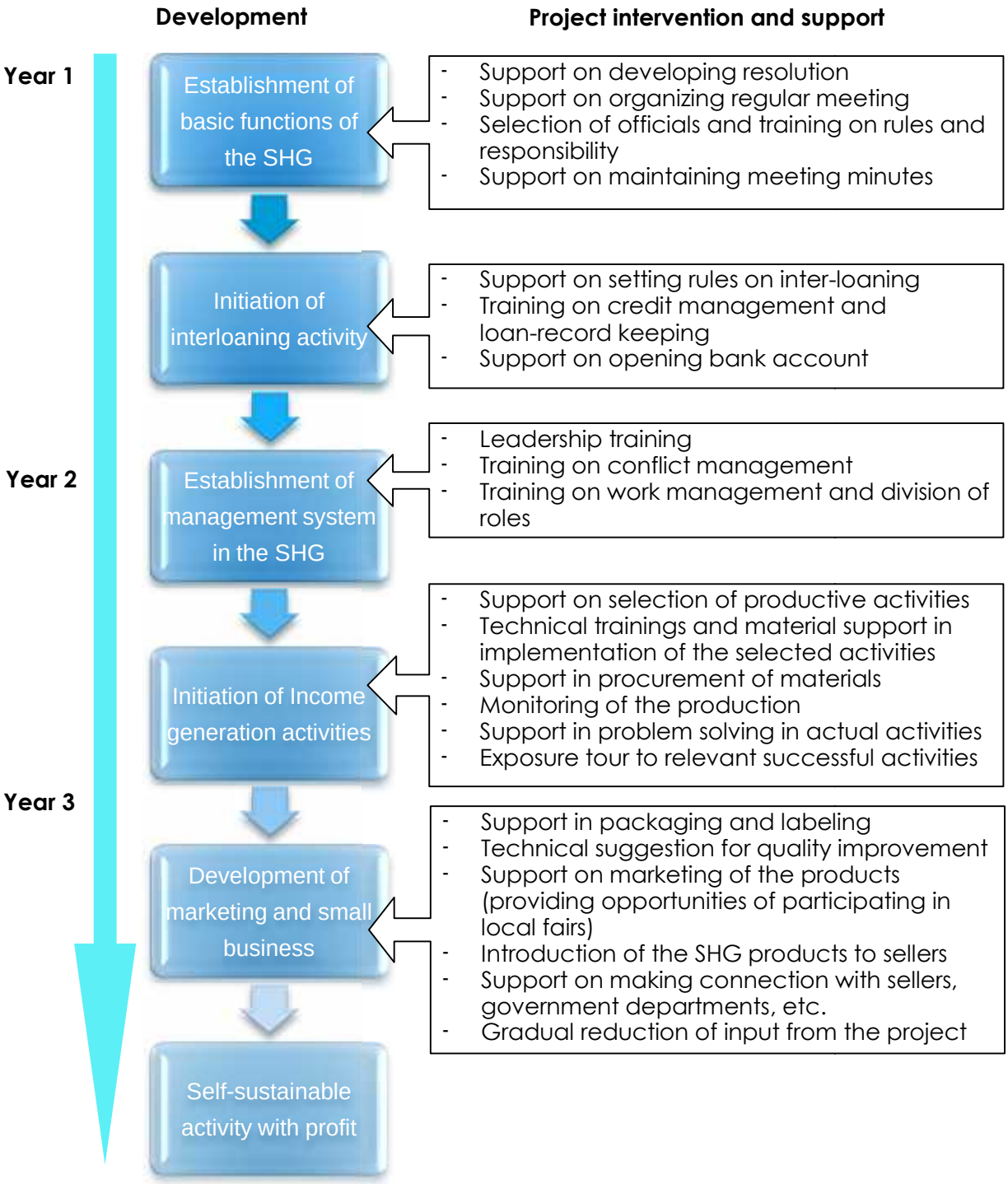


Table 2.6 Steps of SHG Development and Expected Activities in the Crop Diversification Project

Steps	Intervention from crop diversification project
Preparation / Establishment of Support system	Orientation workshop for SHG Training of Community motivator on promotion and strengthening of SHG Training of Community motivator on facilitation for business promotion of SHG
Establishment of group functions (organizational / institutional development)	Training of SHG members on credit management Training on accounting and book keeping
Development of group activity (activity support)	Training on group activities: (Examples) - Organic fertilizer - Seedling raising - Food processing Training on budget making and monitoring Training on promotion and management of business micro-enterprise

Activities for SHG development in the concerned project can be primarily categorized into three steps;

1) preparation / establishment of support system,
2) establishment of group functions (organizational / institutional development), and
3) development of group activity (activity support / technical support).

To start with, it is recommended to prepare both beneficiaries to be supported and supporting system of the project that includes extension officers and community motivators before starting any particular activities in the field. Capacity building of community motivators can be continuous process that may require periodical trainings.

The second step can be establishment of groups as the groups need to have effective operation structures to implement activities. Establishment of the group functions will be foundation of the group activities. Necessary basic group functions include rules in the group, basic financial management and group management systems. After establishing the base of the group, SHGs can implement productive activities for their purpose. Relevant technical knowledge development programmes and trainings shall be conducted during this stage. Please remember that group functions and management established in the second stage should be continuously developed and strengthened during development of group activities through monitoring and follow-up of their practice of management.

The details of the development stages of SHG are explained in *"PART II MANUALS/*

FORMS/ STANDARDS", SHG promotion and Support, Section 1: Introduction of SHG support.

To plan activities and trainings, it is helpful to allocate the activities within your program timeframe. The following shows an example of a timeline of expected trainings and activities based on the training programmes planned in the project.

Table 2.7 Example of Timeframe of SHG Development and Expected Activities in the Project

Organiser	*Training activity*	*Month*											
		1st	*2nd*	*3rd*	*4th*	*5th*	*6th*	*7th*	*8th*	*9th*	*10th*	*11th*	*12th*
Training of SHGs													
Training by DPMU	Training of Women members on leadership, communication, participation etc.												
	Training of office bearers of SHG on book-keeping and accounts												
BPMU (On-site Training by Extension officers)	Orientation and preparation workshop for SHG												
	Training of book keeping for SHG												
	Training of budget making and monitoring for SHG												
	Training of organic fertilizer												
	Training of seedling raising												
	Training of food processing												
Training ***by*** Community Motivators	Training of SHG members on Credit management												
	Workshop of SHG members on Promotion and management of business micro enterprises												
EOs & CMs	Monitoring of SHG practice												
Training of Community Motivators													
DPMU (Training of Community Motivators	Training of Community motivator on promotion and strengthening of SHG												
	Training of Community motivator on facilitation for business promotion of SHG												

(3) Use of Module of 'SHG Promotion and Support'

A basic guidance to implement each activity is shown in a training module of 'SHG promotion and Support' attached in "PART II MANUALS/FORMS/STANDARDS". The following indicates the reference for each activity. Please go through the relevant section when you implement the said activities.

Table 2.8 References in the module for each training programme and activity for SHG development

	Training	Reference in Manual (GD-01-01)	Supplementary materials (Handout and PPT for participants/farmers)	Ref	Reference for trainer	Ref
Training of SHGs						
	Orientation and preparation workshop for SHG	Section 2: Orientation Workshop for SHG	PPT/Handout: Responsibility of members and regular meeting Handout Sample form of SHG by-law Audio video: Success story of SHG	GD-01-03 GD-01-02 GD-01-21	PPT (Eng): Institutional development support strategy PPT (Eng): SHG Development and Support – activity planning PPT (Eng): SHG Development and Support – SHG formation PPT(Eng): SHG Formation	GD-03-01 GD-03-02 GD-03-03 GD-03-04
	Training of SHG members on Credit management	Section 3: Training on Credit management	Material: Loan Record teaching kit PPT / Handout(Hindi): Inter-loaning record	GD-01-19 GD-01-04	PDF doc (Eng): Training manual on SHG for microenterprise development	GD-06-01
	Training of office bearers of SHG on book-keeping and accounts	Section 4: Training on book keeping	Material: Cashbook keeping teaching kit PPT / Handout (Hindi): 'Cashbook Keeping'	GD-01-20 GD-01-05	PDF doc (Eng): A Handbook on forming SHGs	GD-06-02
	Training of Women members on leadership, communication, participation etc.	Section 5 Training on Group management	Handout: Conflict management in a group' (Hindi) Handout: 'Leadership development' (Hindi)	GD-01-06 GD-01-07	PDF (PPT) : Experience of Laharli SHG	GD-03-13
	Training of - **organic fertilizer** - **seedling raising** - **food processing**	Section 6: Training on post harvest, processing and other income generation activity Section 7: Training on value addition to the vegetable	Handout: Pest Control Measures for Nursery Cultivation (Hindi) PPT (Hindi): Balanced Diet and Nutrition Handout(Hindi): Bari and Papad Making Booklet (Hindi): Food Processing booklet PPT/Handout (Hindi): Mulberry Leaves' health value Handout (Hindi): Mulberry Processing	GD-01-08 GD-01-09 GD-01-10 GD-01-11 GD-01-14 GD-01-15	PDF doc (Eng): Food poisoning and its prevention PDF doc (Eng): Making safe food PPT doc (Eng): Nutrition and food processing PTT doc (Eng): Processing skills and packaging	GD-01-12 GD-01-13 GD-03-06a GD-03-06b

	Training of budget making and monitoring for SHG	Section 8: Training on Budget making and financial management	PPT / Handout (Hindi): Budgeting and pricing	GD-01-16	PPT (Eng): Budgeting PPT (Eng): Pricing	GD-03-07 GD-03-08
	Workshop of SHG members on Promotion and management of business micro enterprises	Section 9: Training on promotion and management of business microenterprise	PPT / Handout (Hindi): Business plan and marketing for SHG Handout (Hindi): Sample business plan	GD-01-17 GD-01-18	PPT (Eng): General Concept of microenterprise development PPT: Business planning PPT: Marketing strategy for Microenterprise PPT: Application of Business management to SHG	GD-03-09 GD-03-10 GD-03-11 GD-03-12
	General monitoring and follow-up	Section 12: Follow-up and monitoring				

Table 2.9 References in the module for training programme for Community motivators

	Training	Reference in Manual (GD-01-01)	Supplementary materials (Handout and PPT for participants)	Ref	Reference for trainer	Ref
Training of Community Motivator						
	Training of Community motivator on promotion and strengthening of SHG	Section 10: Training of Community Motivator on 'promotion and strengthening of SHG'	** Handbook for Community Motivator in SHG support (in Hindi)	GD-02	PPT (Eng): Roles and works of the community motivators PPT (Eng): General concept of community motivators PPT (Eng): Roles of community motivators in SHG support	GD-04-01 GD-04-02 GD-04-03
	Training of Community motivator on facilitation for business promotion of SHG	Section 11: Training of Community Motivator on Facilitation for Business promotion	** Handbook for Community Motivator in SHG support (in Hindi)	GD-02	PPT (Eng): General Concept of microenterprise development PPT (Eng): Business planning PPT (Eng): Marketing strategy for Microenterprise PPT (Eng): Application of Business management to SHG	GD-03-09 GD-03-10 GD-03-11 GD-03-12

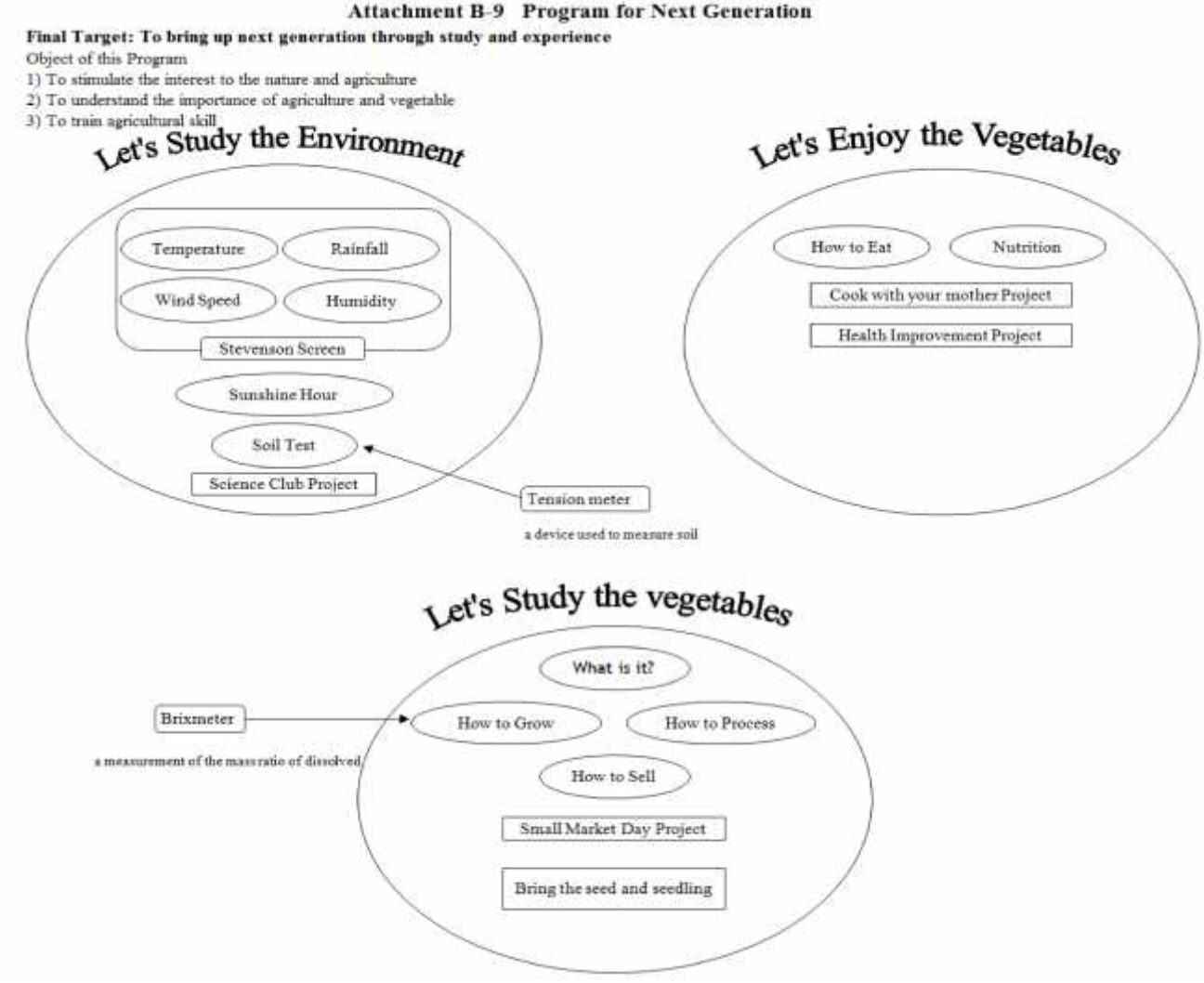
2.5.2 Next Generation Activities

(1) Purpose of next generation activities in crop diversification

In the situation where younger generation tends to leave farming looking for paid jobs, it is crucial for the next generation to understand importance of agriculture as one of their options in life. The objective of the next generation programme in crop diversification project is to enhance interest of school children on vegetable cultivation and consumption to prevent younger generation from leaving away from agriculture for future situation of agriculture development, as well as to improve health situation through increased vegetable consumption. If there are limitations to implement comprehensive programme, it is important to priorities the objective and choose the activity that enable them to achieve the prioritised objective.

1. To stimulate the interest to the nature and agriculture
2. To understand the importance of agriculture and vegetable
3. To train agriculture skill

(2) Components (proposed in the ODA loan preparatory survey report)



(3) Possible activity components

<Let's study the environment>:

The topics covered in this programme includes apprising the children about temperature, rainfall, wind speed, humidity, calculation of the total sunshine hours, and soil testing, which intends to let pupils understand environment that influences agriculture and apply the knowledge in cultivation at home. This can increase better understanding of children in relevant topics of science.

Possible activities to deal with this issue are either integrating the issues in ordinal lessons by elaborating the normal teaching or introducing as extracurricular club activities. It should be noted that this requires supply of equipments, which could be yet used for cultivation activities in the community as well.

<Let's study vegetables>:

The emphasis here will be on sustainable, healthy, and affordable approaches to vegetable cultivation. The children can learn how to grow vegetables in either theoretical or practical ways. Depending on the understanding of children, the topic can vary. In addition to the cultivation skills it can be also important and interesting for children to learn variety of vegetables, function of vegetables, suitable environment for particular vegetables.

These topics can be possibly taught both through school or community activities. It can be integrated it in the relevant subjects of the curriculum by training teachers to elaborate those topics to generate interest of children on agriculture. These learnings can be actually practiced through extra curricular activities. Or it can be demonstrated or displayed in the agriculture events for children in the community.

<Let's enjoy vegetables>:

One of the most important factors for the development of agriculture is growth of consumption. Since vegetable is crucial nutritional source for human health, promotion of vegetable consumption also improve health of the population. Through this programme component, it is expected that pupils enjoy eating vegetable understanding health benefit and good diet and promote consumption of vegetable for better health, which will result in development of agriculture. This component can include enhancing understanding on nutrition of vegetable, cooking/processing methods of vegetables, preservation, value addition etc.

Possible activities to be conducted are;

- Study on nutritional value of vegetables either in classes or extracurricular activities
- Cooking school / class with vegetables either at school in the community with parents
- Cooking fair / competition as an opportunity to share with others and increase motivation.

(4) Possible approaches

1) Integration in school curriculum or extra curricular activities

Each of the programme (study of environment, study of vegetable, utilisation of vegetable) can be carried out either by integrating the programme in the formal curriculum that aligns closely with Schools Education Standards, serving to enhance existing learning about environment or by collaborating with extracurricular activities such as the existing eco-club and environment club in the schools, as well as at-home activities (such as planting at home, cooking vegetable at home etc). In the integrated programme in the curriculum, equipments for experiments of the above mentioned topics can be supported from the project with necessary trainings on their utilisation, in cooperation with the teachers in charge. This has an advantage in materialising the activity as it is closely related with the subjects in the curriculum. On the other hand, the activities will be covered only when the related topic is covered in the text, that would be only once or twice in each school year. For the latter option of cooperation with eco-club, some extra activities can be organised apart from the topics in curriculum as they can be conducted as extra-curricular activity. However, the disadvantage of this approach is that the sustainability highly depends on the motivation and interest level of the teacher in charge and pupils.

2) Involvement of children in community activities

Another option of the approach is to organise educational events or activities in the community that can involve the next generation / school children. The event can be organised with the programme in which children can participate to learn and experience any vegetable related activities such as a part of cultivation, environmental issues surrounding the vegetable cultivation, and use and consumption of vegetables. Although a concern can be raised on lower sustainability if it is an occasional event, it might be, on the other hand, practical and realistic if the project implementing structure has serious limitation (in terms of budget and human resources to take care of the activity). There is a possibility to integrate the occasional event in some periodical event by the government such as periodically organised local fairs to enhance sustainability.

(5) Option for integration in the school activities

1) Possibility and relation with current curriculum and school system

School system

Age (youngest)	Standard	Level / School	
6 yrs	1	Primary level	
7 yrs	2		
8 yrs	3		
9 yrs	4		
10 yrs	5		
11 yrs	6	Middle level	
12 yrs	7		
13 yrs	8		
14 yrs	9	Secondary level	
15 yrs	10		
16 yrs	11	Senior secondary	
17 yrs	12		

- Cultivation
- Cooking with mothers

- Cultivation and processing
- Nutrition knowledge, cooking
- Science club

- Processing, marketing
- Science club

Some components are more suitable to younger children while others are for higher standard pupils. Therefore, it can be more feasible to concentrate on particular components of activities that can be practiced by a particular level of pupils.

The following indicates some agriculture related subject and topics in the curriculum in different level of pupils.

Relevant study subjects

Standard	Level / School	Subjects (topics)
6	Middle level	・Science (Crop Production: crop production, soil preparation, selection of seeds, sowing, applying fertilizers, irrigation, weeding, harvesting and storage) (Micro-organisms: preservation of food)
7		・Geography (Agriculture: types of farming, major crops, food crops, agriculture development)
8		・Social Science (Rural life and society: growth of commercial crops) ・Home science (Food and Cookery: nutrition, effect of cooking, preservation of food)
9	Secondary level	・Science (Control and coordination in plants and animals: tropic movements in plants, introduction to plant hormones. Reproduction in plants)
10		・Social Science (Resources and development: Agriculture; types of farming, cropping pattern, technological reforms) ・Home science (Cookery: nutrition for health, correct selection of food, nutrition values and cost)
11	Senior secondary	・
12		

*According to the interview to some schools, some subjects are not compulsory but optional. It seems not many school choose home science for their classes.

Based on the subjects covered in the carriculum, the project can support teachers to integrate relevant topics of agriculture and vegetable cultivation in their lessons..

Extra-curricular activities

There are some club activities that are related with crop diversification in each school, such as environment club, biodiversity club, and eco club. The environment club mainly covers the theoretical part pertaining to the environment. The biodiversity club focuses on different kinds of flora and fauna present in our surroundings as well as tree plantation, soil sampling and plant monitoring exercises for its students. Eco club mainly consists of studying the atmosphere and environment. Participation to the club is voluntary according to the interest of the student, but in some schools, not many students are interested in and difficult to encourage them to take part in.

In addition to this, some schools arranges various inter house competitions as part of extracurricular activities for its students. One prime example of this is the science model making competition. Those activities can be utilised to integrate agriculture related activities.

2) Target beneficiaries

School children:

It seems to be more effective to focus on the middle school pupils in terms of relevance with their study topic as well as ages of the pupils that are more likely to participate in the practical activities.

Stakeholders and targeted direct beneficiaries

To support a school programme as a project it is inevitable to interact with teachers. Considering establishment and sustainability of the activities, it is more realistic to plan with teachers and train teachers, as well as some direct interaction with pupils, especially technical skill as per necessity.

Success of the programme may highly depend on the teachers in charge of the programme components as well as interest of pupils. It came to be known that most of the students in the school are not very interested in farming related activities (despite many of them having farming background) and they want to seek employment after completion of their studies. Teachers also have mind that education is for better employment. Therefore, it is more feasible to implement by relating the activities with improvement of academic performance by linking up with examinable study topics.

Pupils can be direct and indirect beneficiaries as children benefit from activity through teacher as well as direct learning from the project. If they intervene in practice by children at household level, necessary approach to involve their families as well.

(6) Option for Community activities involving children

1) Target stakeholders

It will be highly depending on the activities. If the activity is something like cooking school with children, mothers and women groups can organise. If it is an event for the community, administration and management of the community should be involved.

2) Possible activities

- Learning tour or opportunity for children in the vegetable field / farms
- Cooking school of vegetables in village level
- Competition events of vegetable / cooking / processing
- Vegetable fair in larger scale that includes learning section or stall for children to gain experiences.

Table 2.10 References for Next Generation Activity

Category	Material	Ref
Next generation programme	Next Generation Activities for HPCDP – options for possible activities -	GD-07-01

2.5.3 Crosscutting Issue ~ Gender and Social Inclusion ~

Why Gender consideration is necessary in Agriculture extension

- Women play critical roles in agriculture production but their contribution is not recognised as a source of economic growth.
- Lower social and economic status of women keep women away from access to information, skills, resources etc.

Improvement of agriculture products by gender equality

- There is clear evidence that female-owned plots are less productive than ones owned by men and that reducing inequality in the allocation of resources in the household could increase income for agricultural households.
- The distribution of physical and human capital for agriculture favours men. Differences in rights and responsibilities in the household lead to an inequitable distribution of resources, and that reduces agricultural productivity.
- There is good evidence that achieving gender equality could increase agricultural profits and yields. Some studies show that reducing gender inequality, for example in the allocation of fertilizer, could increase output by 10 ~ 20 per cent.

Source: Ward John, Lee Bernice, Baptist Simon and Jackson Helen, 2010, 'Evidence for Action Gender Equality and Economic Growth' , Chatham House (The Royal Institute of International Affairs)

Complication of gender issue

- Fundamental issue of gender and social inclusion is change of people's mindset and

culture. It is difficult to recognise its benefit as they are often indirectly influencing and it takes time to realize through gradual changes in wider perspectives.

- Gender issue is complicated as people do not notice it is a problem as they are living in the society where it is common or it is adopted as their culture.
- In younger generation, understanding and perspectives on gender and social classes might be different. However, when we, extension officers, deal with elderly farmers who may stick to traditional perspectives, we should think from their view point firstly understanding their perception of gender and social structure.

Table 2.11 Tips for gender and social inclusion in each project activity

Activity	Common issues	Suggested approach
Infrastructure development	• Design that does not reflect people's opinion can create conflicts. • Where women are major users of the irrigation, involvement of women in designing is inevitable.	• Design : need to analyze who will be using water and who will benefit from it. The design process should incorporate opinions of male and female users, as well as the underprivileged and minorities in order to accommodate their wishes, ideas, needs and requirements. (e.g. if a part of foot pass needs to be excavated to lie water pipeline, women who use the pass to collect fodder may face problem). • Assess the problems faced by women while accessing water and address those problems eg. by institutionalizing water distribution and by challenging the norms of women that make women unable to undertake any specific work.
Water management	• Irrigated farm requires effective decision of watering time. Who decide? • Management of water in the community: Do the rules of water distribution reflect opinions of women? Are women involved in discussion and decision making of water distribution? (including representation in WUA) • Are women's specific needs considered? e.g. time limitation of women (safety of night irrigation, limitation of time due to houseworks)	• Positive discrimination – Allocation of a certain No. of seats in GMKVA MC for women – Assure right to vote even if women are not main registered member of the GMKVA • Assure participation of women in the meeting for decision making – Information shall be especially delivered to women – Facilitation in the meeting to draw out opinion of women • Check the following issues, and make special arrangement to remove constraints if you observe any – Does the land ownership constrain the access of women or disadvantaged people to resources? – How have the rules of water distribution and management been decided? Whose opinion was adopted? – Has technical training and access to complementary support service been provided to both men and women? – What is the impact of irrigation water distribution on the workload of both men and women?
Farming	• Yields on plot managed by women are lower than those	• Understand the gender situation of target households (male headed/female headed?

	managed by men significantly because of lack of access to farm input for women. • Women has less access to new technology, and even when they receive the knowledge, there are constraints to adopt (e.g. cannot afford to apply new technology, risk of new crop is too high for vulnerable women) • Women lack control over expense to purchase new equipment while men will not invest cash when women's manual labour is available at no cost	who are main actors of cultivation?) • Pay attention during distribution of materials (such as fertiliser, seeds etc) on who are receiving, making sure to distribute to those who actually use (make sure that women are not excluded). • Participation in the training (assure participation of women by arranging training with time, venue preferred by women)
Agriculture marketing	• Stereotype that marketing is done by men. • It is implicitly prevented for women to market in the wholesale market • Women lack skills and knowledge of marketing and negotiation • Profit after marketing of their produce are not equally shared (mainly due to lack of information or power of controlling money)	• Enable women to access to market information • Strategically involve women with specific consideration of their needs in marketing to make confidence. • Remove barrier for women to participate in marketing (not just training women, but it required understanding of the society to allow women to take up those activities)
Agriculture extension service delivery	• Information tends to be delivered to men due to limitation of women in participation to official occasion. • Male extension officers are restricted to approach women farmers due to cultural sense. • Subsidy and agriculture input are delivered to men because it is distributed based on land ownership	• Positive discrimination in extension service – Especially targeting women, set a certain allocation for participation of women • Approach to women – When male extension officers to interact with women, how much can they open-up? If some women hesitate, approach them through other active women who can interact and share with them. • Involvement of women and deliver information to women – Involve even a few women. Women group is a good information sharing channel. Make use of women groups to make sure information is shared among a good number of women

Table 2.12 References for Gender and Social consideration in the project activities

Category	Material	Ref
Gender and Social Inclusion	Orientation on Gender and Social Inclusion	GD-05-01
	Gender respective PCM	GD-05-02
	Gender in Agriculture Extension Work	GD-05-03
	Gender in Agriculture - Sourcebook	GD-06-05

2.6 Marketing

(1) Marketing Support to Farmers

For promoting crop diversification, marketing support of promotion of agricultural products to farmer is also one important aspect. Marketing support under crop diversification project shall be implemented based on the following steps.

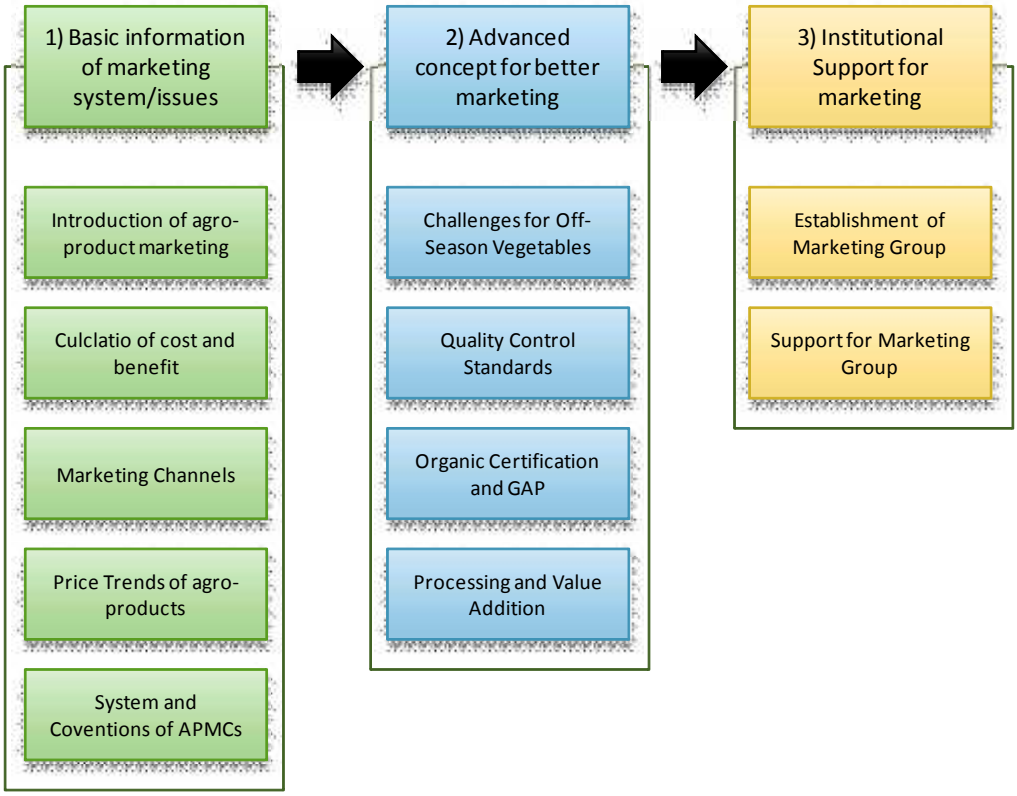


Fig. 2.11 Step of Marketing Support under Crop Diversification Project

As shown in the above Fig. 2.11, first step for marketing support is to provide farmers necessary essential knowledge of marketing systems/issues in Himachal Pradesh such as marketing channel, importance of calculation of cost and benefit, price trends and so on. Target farmers under crop diversification project are those who are newly introducing vegetable cultivation instead of food crop cultivation, so they are not familiar with commercial sales of their agro-product. Because of this big challenge for farmers, it is very important not only just providing information of marketing related issues but also motivating them and changing their mind for commercial sales of agro-products. This step shall be applied to all of farmers at beginning stage of each sub-project. Once or twice training(s) by extension officers is/are recommended regarding marketing for farmers in sub-project area.

Next step is to providing farmers more advanced knowledge of marketing of agro-products, such as quality control standards, processing and value addition and so on. After several cropping season introducing vegetable cultivation, part of the farmers could increase their production and sales. This step is targeting those farmers who relatively

advance in each sub-project area. It might be impossible to guide all of farmers in project area for successful vegetable cultivation since their motivation is different depending on farmers' situation. It shall be suitable for marketing support for crop diversification project in Himachal Pradesh to use stepwise support depending on farmers' motivation, skills and knowledge. This step shall be applied a part of advanced selected farmers for more better marketing of their agro-products one or more year after starting of vegetable cultivation.

Third step is institutional support for farmers marketing activities. Since most of farmers are marginal and small in Himachal Pradesh, group marketing is one the best choice to get high prices for their agro-product. This step is targeting at farmers who is trying to form marketing groups. Crop diversification project needs to support those farmers to establish farmers group. In this step utilization of resource person such as Universities, Marketing Board etc. might be effective. After formulation of group, seasonal support by extension officer and fair/matching between farmers group and private companies also importance for sustainable activity by farmers group. These three steps are summarized in Table 2.9 below:

Table 2.13 Summary of Marketing Support under Crop Diversification Project

Step	Contents	How	Target	Timing
1) Basic information of marketing	・ Introduction and motivation of marketing ・ Calculation of cost and benefit ・ Marketing channels ・ Price trends of agro-products ・ System and convention of APMCs	Training by extension officers/ Utilization of training materials	All farmers in each sub-project area	Beginning of vegetable cultivation
2) Advanced concept for better marketing	・ Challenges to cultivation of high-valued vegetables ・ Quality control standards ・ Organic certification and GAP ・ Processing and value addition	Training by extension officers/ resource agencies	Selected/advanced farmers	One year after starting vegetable cultivation
3) Institutional support for marketing	・ Establishment of marketing group ・ Seasonal support for marketing groups ・ Fair/Matching between farmers and privates	Training by resource agencies	Selected sub-project area	Depending upon farmers' needs and motivation.

(2) Key Issues for Marketing

As mentioned already, at least one session for farmers to provide knowledge of marketing issues/systems are essential under crop diversification project. This shall be done by extension officers in charge of each sub-project directly to farmers. Extension officers should understand knowledge and concept of agro-product marketing. Essential information and key points of marketing activities are described in the following sub-section.

1) Introduction and Motivation of Marketing

Marketing in case of agricultural crops is very challenging; it becomes all the more challenging in the case of vegetables owing to their highly perishable nature. Some of the challenges faced by farmers in marketing of vegetable produce are: limited marketable surplus owing to small land holdings, high volume products hence higher transportation cost, varied produce hence difficult to have standards, seasonality of produce (glut in peak season and high prices during off –season), lack of infrastructural facilities (cold stores, processing facilities etc.), lack of consumer cooperatives, malpractices in regulated markets.

Hence, it becomes very important for you to ensure that farmer has a clear answer to all of these questions:

1. *Why to produce?*
2. *What to produce?*
3. *When to produce?*
4. *How much to produce?*
5. *Where to sell his produce?*
6. *How/Whom to sell his produce?*

Once, farmer has a clear understanding about these questions, he is in a better position to plan his production strategy and is assured that he is producing a saleable product.

2) Calculation of Production Cost and Benefit

Some points of discussion that you should explain to the farmers are:

1. *Why does the farmer needs to know about production cost?*
2. *How to calculate production cost?*
3. *How can you calculate production cost accurately?*
4. *How to use the information on production cost for decision making?*

When a farmer takes to vegetable cultivation on a commercial scale, it is important that he develops business acumen and makes decisions based on facts and not his gut-feeling. Tracking his expenditures and benefits diligently is very essential to find out if he is actually making profits or losses while undertaking vegetable farming.

Ascertaining the correct cost of cultivation is important for the farmer to make decisions like; what are the areas where cost cutting is required? What is the net benefit earned by the farmer at the end of growing season? Whether vegetable farming is really remunerative to the farmer?

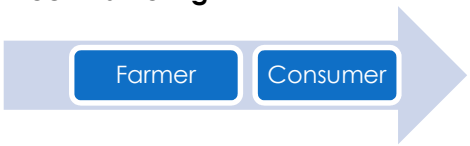
One of the important prerequisites for estimating the correct cost of cultivation is proper documentation of day to day activities in which expenditure is incurred. Based on the proper documentation of his costs incurred and benefits accrued, the farmer can ascertain if he needs to change his strategy for farming and marketing or should he

continue farming vegetables at all. As samples, crop budgets of major vegetables in Rabi 2012/13, Kharif 2013, and Rabi 2013/14 are shown in II-6 Marketing in PART-II of the Guidelines.

3) Marketing Channels

Knowledge of marketing channels is important for the farmers as farmer can device his marketing strategy based on this information. He has to understand what are the available options with him where he can sell off his produce. Selling off the produce is not the sole criteria; earning maximum profit is the objective of the farmer. Hence, the knowledge of marketing channels is also helpful to him to devise his production strategy. If he wants to sell his produce by himself, his production strategy should ideally be to grow more number of vegetable crops in small quantities and spread his harvesting season over a period of time. However, if he knows he will use an alternative marketing channel wherein he is able to dispose-off his produce to a commission agent, his production strategy will vary in a sense that he focuses on less number of crops but more intensively.

Marketing channels that are available to the farmer along with their benefits and drawbacks is summarized as follows:

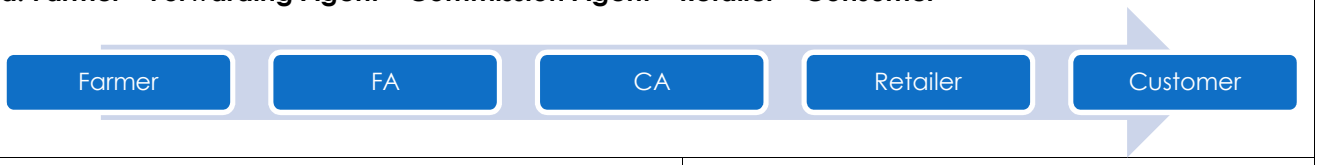
<table>
<tr><th colspan="2">Marketing channel</th></tr>
<tr><td colspan="2">a. Direct Marketing
 
</td></tr>
<tr><td>Strengths/benefits
· Consumer gets fresh vegetables as farmer is harvesting and directly selling – less time gap
· The farmer gets a higher price as middlemen are not involved
· Lesser transition cost (transportation over short distance, grading/packing not really needed) – hence relatively cheaper to consumer.
· Consumer gets to know the producer and is assured of quality of produce – the source of production is easily traceable.</td><td>Drawbacks
· This channel is effective for farmers having immediate access to markets.
· Farmer has to spare time for marketing activities
· Farmer does not have storage facility and has to sell all his produce the same day – so he has to lower the price to attract the consumers.</td></tr>
<tr><td colspan="2">b. Farmer – Retailer – Consumer
 
</td></tr>
<tr><td>Strengths/benefits
· Farmer need not take produce to APMC- thereby saves transportation cost, packing cost – good for farmers who have limited marketable surplus.
· Farmers can sell produce to retailers at the price prevailing in APMC.</td><td>Drawbacks
· This activity is seasonal in nature
· The retailer negotiates the price with farmer depending upon the quality of produce – if produce is good quality and sorted well, the farmer gets price equivalent to APMC</td></tr>
</table>

· Farmer can sell his produce immediately and can focus on production activities. · Retailer also saves on his transportation cost/time and purchases produce at the shop.	

c. Farmer – CA – Retailer – Consumer

Strengths/benefits	***Drawbacks***
· Farmer does not have to pay any fee for selling his produce in the market. · Price of produce is determined either by open auction amongst buyers or through price negotiation. · Big farmers can sell their produce at one place as there are a number of buyers. · The Government has set up market yard/Agriculture Produce Marketing Committees to cater to the needs of this marketing channel. The physical infrastructure has been put in place to enable farmer bring his produce to the market yard and get it auctioned/sold in the presence of a number of buyers so that best prices can be availed.	· Commission agents also import produce from outside to check the prices. · A number of malpractices still prevalent despite control of government. · Poor infrastructure facilities for auction, storage etc.

d. Farmer – Forwarding Agent – Commission Agent – Retailer – Consumer



Strengths/benefits	***Drawbacks***
· Forwarding agent provides service by insuring the produce and transporting it to the market. · This is helpful especially in those areas where vegetables are grown on a large scale. · These facilities help farmers access markets outside the state – which are not easy if individual farmer has to do it by himself.	· The longer the chain, more the number of middlemen, higher the inefficiencies are there in the marketing channel

Remarks) refer Distribution Channel in 5 Districts in II-6 Marketing of PART II of the Guidelines

Fig 2.12 Marketing Channels

4) Price Trends of Agro-Product

To effectively plan for any production activity, it is essential to have a good idea about the expected benefits at the end of the production activity (as in case of durable goods, price of inputs is known, the efficiency and capacity of machinery is known, the selling price is known, the margins of intermediaries are know well in advance and so the planning in this scenario is easy and effective). However, in case of vegetable farming, lack of this information becomes the biggest constraint for planning. In the absence of effective planning, the risk involved in farming gets accentuated. The uncertainty in quantum of production and no effective price forecasting methods, the farmer has little choice but to depend on price trends of the past to plan his production strategy.

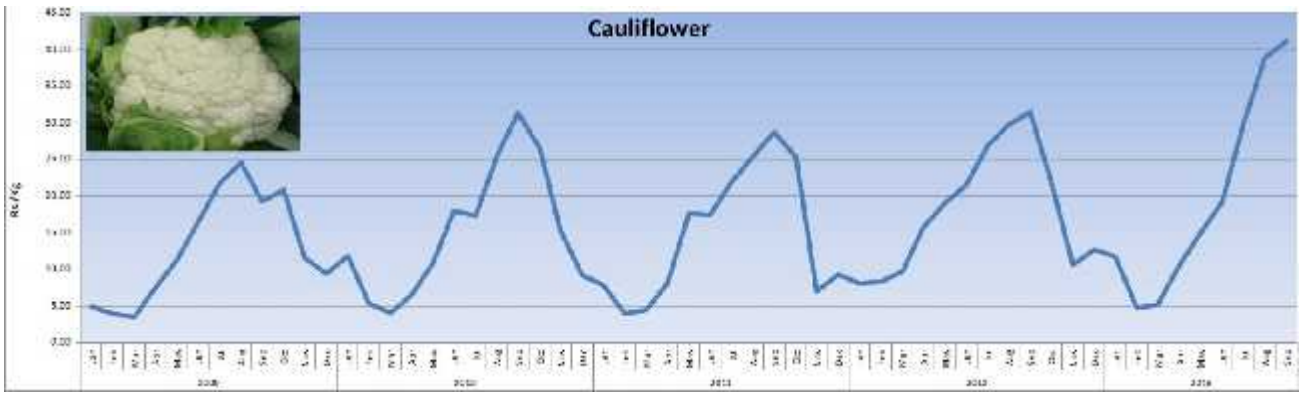


Fig 2.13 Price Trend of Cauliflower in Dusarka APMC, Hamirpur from 2009-2013

By plotting the prices of vegetables over a period of time, we are able to see a iterative trend in case of cauliflower in Dusarka market as shown in Fig. 2.13. The trend shows that the minimum price is received during the months of January and February and maximum price can be availed somewhere during July-August. As, it is not possible to produce cauliflower during the month of July-August in open conditions, but if harvest time is planned in such a manner that produce comes to market in late October-early November, then significantly good prices may be obtained (which may be 2-3 times more than the price received during peak season).

These trends may be drawn using monthly, daily or weekly price information either APMCs or may be collated from *www.agmarknet.nic.in* hence the trends could be plotted using MS-Excel (refer Monthly Average Wholesale Prices in II-6 Marketing of PART-II in the Guidelines).

It is pertinent to mention that trends of prices may vary slightly from year to year as seasonality in harvest of produce is dependent on a number of events e.g. time of arrival of monsoons/rains, temperature conditions, area under production etc. As an extension officer, you should be able to use these trends as broader indicators of price and help farmers plan their sowing/harvesting season.

5) Agricultural Standards in the State of Himachal Pradesh

There are no exclusive standards in the State of Himachal Pradesh. Standards of AGMARK are followed. However there are marketing conventions that are used in APMCs during buying and selling transactions are responsible for ascertaining the prices of vegetables in addition to interaction of demand and supply.

The common conventions use weight/size, color, freshness as the main criteria for sorting the best lot from the other lots. Local vegetables are preferred as the transportation time from field to market is much less as compared to vegetables coming from outside. In some cases, local varieties (and not hybrids) fetch higher prices in the market, because of better taste, preferred by the consumers-e.g. in case of local cucumber as compared to hybrid cucumber.

Table 2.14 Grading Conventions in Use for Major Vegetables in Himachal Pradesh

Vegetable	Grading Conventions
Tomato	· 12-15 tomatoes to make 1 kg i.e. average weight of tomatoes to be 65-80 grams · Uniform pink color desired · Tomatoes should not be too soft (indicative of ripeness) or too hard · Plastic crates to be used for transportation/packing
Cauliflower	· Weigh about 600-750 per piece · Each curd should be compact · Should not have excessive foliage/stem · Cauliflower – white colored curd
Cabbage	· Weigh about 600-750 per piece · Should not have excessive foliage/stem · Each head/curd should be compact · Cabbage – green colored head
Potatoes	· Three grades are prevalent 1) Ration – > 3.5 inches (2) Medium: 2 – 3.5 inches (3) Goli – < 2 inches · Should not have green spots · Should not have sprouts · About 10 potatoes should make 1 kg. · Should be washed – should not have soil
Peas	· Should have larger pods with more number of seeds i.e. about 10 seeds/pod – seed variety also determines the price · Pods should have compact, firmly packed seeds
Beans	· Thinner and longer beans fetch better price (Falguni variety) · Seed formation should not be there · Should snap immediately
Capsicum	· Length 3-5 inches · Shape should be uniform – not convoluted · Uniform green color · Plastic crates to be used for packing and transportation
Okra	· Should be 6-7cm long · Should not be mature and not contain seeds
Radish	· Should be 250-300 g by weight along with leaves · Should be around 1 feet long · Should be white in color
Pumpkin	· Size should be 2-3 kg – smaller size is preferred · Should be green and fresh · Ripened pumpkin should be of yellowish color uniformly – 2-3 kg weight
Colocasia	· Rates vary as per variety · Kachalu (bigger in size) · Arbi (smaller size) · Ghandialy – local variety
Green Chili	· Should be hot in taste
Bottle gourd	· Weight around 400-500 grams · Soft textured · Fresh and uniform green colour
Snake gourd	· Weight 150 -200 grams and length 1-1.5 feet · Soft textured – without seed formation · Graded and fresh
Brinjal	· Should be fresh and clean (should not have any cavities due to insect/pests) · Should be about 200 grams by weight in case of round brinal and 100-150 grams in case of long brinjal · Color should be uniform

Source) Commission Agents in APMCs of Bilaspur, Hamirpur, Kangra, Mandi, and Una

Apart from sorting the vegetables from aforementioned conventions, the wholesalers in APMCs also prefer packaging material that causes least damage to produce while transportation.

CHAPTER 3

TRAINING CURRICULUMS

3.1 Outline of Training Curriculums

This chapter shows the model of training curriculums which shall be conducted to farmers in a certain sub-project area for crop diversification. These training curriculums were prepared based on TCP experiences which were obtained from a series of training programs to farmers in the Lahalri pilot area.

The curriculums cover all of the necessary agricultural techniques for farmers when they promote crop diversification, namely 1) Water management and O&M for irrigation facilities, 2) vegetable farming and post-harvest, 3) SHG development (Gender) and 4) Marketing. The training curriculums also show necessary subjects and related manuals/training materials in each technique. Each subject is summarized as a table which includes the objective, summary, contents, target, timing, resource person, and etc. of the trainings. So you can easily understand the point of the training and how to conduct the training and also can refer the related manuals/training materials.

These training curriculums are expected to be utilized especially for trainings under HPCDP or the other programs/projects under DoA. Since the curriculum is a typical model for crop diversification, it is recommended to modify the training curriculum based on the situation of the site and farmers.

3.2 Training Curriculums for Crop Diversification

(1) Water Management and O&M for Irrigation Facilities

Table 3.1 Training Curriculums for Water Management/O&M

Category	Code	Subjects on Training Curriculum for Farmers	Sub-Code in PART-II: Manuals / Training Materials*
Participatory Irrigation Management	WM-01	Water Management by WUA	WM-01-01
			WM-01-02
			WM-01-03
	WM-02	Establishment of WUA	WM-02-01
			WM-02-02
			WM-02-03
			WM-02-04
	WM-03	Water Distribution	WM-03-01
			WM-03-02
			WM-03-03
			WM-03-04
	WM-04	Operation of Irrigation Facilities	WM-04-01
			WM-04-02
			WM-04-03
	WM-05	Maintenance of Irrigation Facilities	WM-05-01
			WM-05-02
			WM-05-03
Institutional Development	WM-06	Leadership Development	WM-06-01
	WM-07	Conflict Management	WM-07-01
			WM-07-02
			WM-07-03
Agricultural Engineering	WM-08	Micro Irrigation: Sprinkler	WM-08-01
			WM-08-02
	WM-09	Micro Irrigation: Drip Irrigation	WM-09-01
			WM-09-02
			WM-09-03
			WM-09-04

WM-01		
Title of Subject	:	***Water Management by Water Users' Association (WUA)***
Stage	:	Before the establishment of WUA and review depending on the needs
Place	:	Each sub-project area
Target	:	All Farmers
Method	:	(Lecture), Hands-on, Exposure Visit
Duration	:	One to two day
Resource Person	:	BPMU Officers
Key word	:	WUA/KVA, Record Keeping, Water Tariff, Community Motivator

Summary of training:

To develop and utilize the irrigation facilities, the role of Water Users' Association (WUA) is essential because WUA shall be an owner of the facilities. If WUA doesn't function well, farmers will not be able to share irrigation water properly and also not be able to collect enough water tariff for pumping cost or repairing cost of the facilities. That is to say, malfunction of WUA means the failure of irrigation project. In this training, farmers can get information on organization of WUA, activities of WUA, Water Tariff, Record Keeping and Public Support.

Objective : ➢ To learn essential information of Water Users' Association

Contents of training:

Session 1: Organization of WUA and its establishment
Session 2: Activities of WUA
Session 3: O&M cost/Water Tariff
Session 4: Record Keeping
Session 5: Public Support
Session 6: Discussion between extension officer and farmers

Materials /References	Topics/Source	Type	Code
	Guidelines for Water Management by Water Users' Association (WUA) /JICA TCP	Booklet & PPT	WM-01-01, 01-02 (English, Hindi & PPTs)
	Formats of Records Keeping of WUA / JICA TCP	Excel	WM-01-03
	Guidelines for Water Management by Water Users' Association (WUA) /JICA TCP	Booklet & PPT	WM-01-01, 01-02 (English, Hindi & PPTs)

Image Photos of subject

WM-02		
Title of Subject	:	***Establishment of WUA***
Stage	:	Before the establishment of WUA
Place	:	Each sub-project area
Target	:	All Farmers
Method	:	(Lecture), Hands-on, Exposure Visit
Duration	:	One day
Resource Person	:	BPMU Officers
Key word	:	Formation of WUA, Rules and Regulations of WUA, Community Motivator

Summary of training:

To develop and utilize the irrigation facilities, the role of Water Users' Association (WUA) is essential because WUA shall be an owner of the facilities. In Himachal Pradesh, WUA needs to get it registered under the Himachal Pradesh Societies Registration Act 2006. In this training, farmers can get information on establishment of the WUA and rules & regulations of the WUA.

Objective : ➢ To learn essential information of Water Users' Association

Contents of training:

Session 1: Formation and registration of WUA

Session 2: Rules and Regulations of WUA

Session 3: Registration process in Lahalri Pilot Project

Session 4: Discussion between extension officer and farmers

Materials /References

Topics/Source	Type	Code
Formation and Registration of WUA /JICA TCP	Handout, PPT	WM-02-01, 02-02
Rules and Regulations of WUA /JICA TCP	PPT	WM-02-03
GMKVA Registration /JICA TCP	Booklet	WM-02-04

Image Photos of subject

WM-03		
Title of Subject	:	*Water Distribution*
Stage	:	Just before or after the completion of irrigation facilities
Place	:	Each sub-project area
Target	:	All farmers
Method	:	(Lecture), Hands-on, Exposure Visit
Duration	:	Half day
Resource Person	:	BPMU Officers
Key word	:	Water distribution, Warabandi, request based method, block rotation system, timing & quantity of irrigation

Summary of training:

To promote crop diversification, irrigation water needs to be delivered properly in the project area. Therefore rule of water distribution needs to be decided by WUA. In this training, farmer can get information on principle of water distribution, method of water distribution and timing & quantity of irrigation.

Objective : ➢ To learn basic information on water distribution

Contents of training:

Session 1: Rule and Principle of Water Distribution
Session 2: Water Distribution Method
Session 3: Timing and Quantity of Irrigation
Session 4: Water Distribution in Lahalri Pilot Project
Session 5: Discussion between extension officer and farmers

Materials /References

Topics/Source	Type	Code
Guidelines for Water Distribution /JICA TCP	Booklet & PPT	WM-03-01, 03-02 (English, Hindi & PPT)
Formats of Records Keeping of WUA	Excel	WM-01-03 (English & Hindi)
Rules for Water Distribution in Lahalri Pilot Project (Report)	Booklet	WM-03-03
Guidelines for Water Distribution /JICA TCP	Booklet & PPT	WM-03-01, 03-02 (English, Hindi & PPT)

Image Photos of subject

WM - 04

Title of Subject	:	*Operation of Irrigation Facilities*
Stage	:	Just after completion of irrigation facilities
Place	:	Each sub-project area
Target	:	Management Committee, Pump Operator, Community Motivator
Method	:	Lecture, hand holding, exposure visit
Duration	:	Half day
Resource Person	:	BPMU officer
Key Words	:	Operation of irrigation facilities (pump, tank and valves), Trouble Shooting to no water lifting

Summary of Trainings:

Operation of irrigation facilities means a series of operations to take water from a river or a tube-well and deliver to farm lands. Irrigation facilities can be categorized to flow irrigation, tube-well irrigation, lift irrigation and others. Among them, lift irrigation is the most difficult for operation. If you become proficient in the operation of lift irrigation, it is easy to know the method of operating the facilities of the other irrigation systems. Therefore operation of the lift irrigation facilities is mainly explained in this training. At first, operation of the pump and water distribution is explained as a general case. And then operation in the Lahalri Pilot Project (Lift irrigation) is explained in detail.

Objective : ➢ To learn basic information on operation of irrigation facilities

Contents of training:

Session 1: Outline of Operating Irrigation Facilities
Session 2: Pump Operation
Session 3: Operation of Water Distribution
Session 4: Operation of Irrigation Facilities in Lahalri Pilot Project
Session 5: Practical session of records keeping

Materials/ References

Topics/Source	Type	Code
Guidelines for Operation of Irrigation Facilities /JICA TCP	Booklet & PPT	WM-04-01, 04-02 (English, Hindi & PPT)
Formats of Records Keeping of WUA	Excel	WM-01-03 (English & Hindi)

Image Photos of Subject

WM - 05		
Title of Subject	:	*Maintenance of Irrigation Facilities*
Stage	:	Just after completion of irrigation facilities
Place	:	Each sub-project area
Target	:	Management Committee, Pump Operator, Community Motivator
Method	:	Lecture, hand holding, exposure visit
Duration	:	One day
Resource Person	:	BPMU Officer
Key Words	:	Methods of maintenance, daily inspection, periodical inspection, record keeping, cleaning of irrigation facilities

Summary of Trainings:

Maintenance of irrigation facilities is essential for the sustainability of Water Users' Association. Irrigation facilities can be categorized to flow irrigation, tube-well irrigation, lift irrigation and others. In this training, maintenance of main irrigation facilities (Diversion weir, pumping facilities, water storage tank, open channel and pipeline) are explained in detail.

Objective : ➢ To learn the information on maintenance of irrigation facilities

Contents of training:

Session 1: Needs of Maintenance and Methods of Inspection
Session 2: Diversion Weir (FIS, LIS)
Session 3: Pumping Facilities (LIS, TWIS)
Session 4: Water Storage Tank (LIS, TWIS)
Session 5: Open Channel (FIS, TWIS)
Session 6: Pipeline (LIS, TWIS)
Session 7: Lessons Learned from the Lahalri Pilot Project
Session 8: Practical session of records keeping

Materials/ References

Topics/Source	Type	Code
Guidelines for Maintenance of Irrigation Facilities /JICA TCP	Booklet & PPT	WM-05-01, 05-02 (English, Hindi & PPT)
Formats of Records Keeping of WUA	Excel	WM-01-03 (English & Hindi)

Image Photos of Subject

WM-06

Title of Subject	:	*Leadership Development*
Stage	:	After the establishment of Water Users' Association
Place	:	Palampur University or other university
Target	:	All farmers
Method	:	(Lecture), Hands-on, Exposure Visit
Duration	:	Half day
Resource Person	:	BPMU Officers
Key word	:	Leadership, type of leaders, 5Cs, leadership styles

Summary of training:

After handing over the irrigation facilities to WUA, WUA need to manage all the irrigation facilities as their property. Therefore, leadership of each farmer is very important to manage the irrigation facilities. In this subject, farmers can learn 1) importance of leadership, 2) types of leaders, 3) 5Cs in leadership, 4) qualities of leader, 5) leadership styles and the others.

Objective : ➢ To learn the basic knowledge needed for leadership Development

Contents of training:

Session 1: Importance of leadership
Session 2: Types of Leaders
Session 3: 5Cs in leadership
Session 4: Qualities of leader
Session 5: Leadership styles
Session 6: Discussion between extension officer and farmers

Materials /References	Topics/Source	Type	Code
	Concept and Meaning of Leadership Development /Dr. Anup Katoch (CSKHPKV)	Booklet	WM-06-01

Image Photos of subject

WM-07		
Title of Subject	:	*Conflict Management*
Stage	:	After the establishment of Water Users' Association
Place	:	Palampur University or other university
Target	:	All farmers
Method	:	(Lecture), Hands-on, Exposure Visit
Duration	:	Half day
Resource Person	:	Resource person from university
Key word	:	Principle of conflict, types of people, Preventing conflict

Summary of training:

There is a possibility of coming conflict in various stage of irrigation project. That is because there are so many kinds of stakeholders in a irrigation project. Therefore the management of conflict is very important in irrigation project. In this subject, farmers can learn 1) definition of conflict, 2) principle of conflict, 3) types of people, 4) causes of conflict, 5) preventing conflict and the others.

Objective : ➢ To learn the basic knowledge needed for conflict resolution

Contents of training:

Session 1: Definition of conflict
Session 2: Principle of conflict
Session 3: Types of people
Session 4: Causes of conflict
Session 5: Preventing conflict
Session 6: Discussion between extension officer and farmers

Materials /References	Topics/Source	Type	Code
	Conflict management and role of village level leaders /Dr. J.S.Guleria (CSKHPKV)	Booklet	WM-07-01
	Conflict Management /Dr. J.S.Guleria (CSKHPKV)	PPT	WM-07-02
	Problem Solving	PPT	WM-07-03

Image Photos of subject

WM-08

Title of Subject	:	*Micro-irrigation in Himachal Pradesh: Sprinkler irrigation*
Stage	:	After the completion of irrigation facilities
Place	:	Palampur University or other university
Target	:	All farmers
Method	:	(Lecture), Hands-on, Exposure Visit
Duration	:	Half day
Resource Person	:	Resource person from university
Key word	:	Micro irrigation, Sprinkler irrigation, nozzle, irrigation efficiency

Summary of training:

When we use the sprinkler irrigation for cultivation, we can save water and increase the productivity. In this subject, we can learn 1) role and effect of sprinkler irrigation, 2) component of sprinkler irrigation (sprinkler head, laterals, risers and mainlines & sub-mains), 3) basic of designing sprinkler irrigation system and the others.

Objective : ➢ To learn the basic knowledge needed for sprinkler irrigation

Contents of training:

Session 1: Types of sprinkler Irrigation system

Session 2: Capacity of the system, Components of sprinkler irrigation system

Session 3: Sprinkler design, Irrigation Interval, System layout, Application rate, Nozzle discharge, Size of laterals, Pressure in the laterals, Optimum water application rate

Session 4: Advantages & disadvantages of sprinkler Irrigation.

Materials /References

Topics/Source	Type	Code
Micro Irrigation in Himachal Pradesh: Design of Sprinkler Irrigation System /Dr. RK Gupta (CSKHPKV)	Booklet	WM-08-01
Micro Irrigation System: Design of Sprinkler Irrigation Systems /Dr. RK Gupta (CSKHPKV)	PPT	WM-08-02

Image Photos of subject

WM-09		
Title of Subject	:	*Micro-irrigation in Himachal Pradesh: Drip irrigation*
Stage	:	After the completion of irrigation facilities
Place	:	Palampur University or other university
Target	:	All farmers
Method	:	(Lecture), Hands-on, Exposure Visit
Duration	:	Half day
Resource Person	:	Resource person from university
Key word	:	Micro irrigation, drip irrigation, emitter, fertigation

Summary of training:

When we use the drip irrigation for cultivation, we can save water and increase the productivity. In this subject, we can learn 1) role and effect of drip irrigation, 2) component of drip irrigation (Water emitting devices, distribution line (Main and sub-main pipe, lateral pipe), filtration equipment), 3) fertigation, 4) basic of designing drip irrigation system and the others.

Objective : ➢ To learn the basic knowledge needed for conflict resolution

Contents of training:

Session 1: Components and Types of Drip irrigation systems
Session 2: Design of Drip Irrigation
Session 3: Fertigation through drip irrigation system
Session 4: Control of clogging
Session 5: Advantages & disadvantages of Drip Irrigation

Materials /References

Topics/Source	Type	Code
O&M, Fertigation and Installation of Micro Irrigation /Dr. R.S.Rana (CSKHPKV)	Booklet	WM-09-01
Drip irrigation, its design and application uniformity /Dr.R.S.Rana	PPT	WM-09-02
O&M of Drip Irrigation-Hindi /JICA TCP	Handout	WM-09-03
O&M of Micro Irrigation /JICA TCP	Booklet	WM-09-04

Image Photos of subject

(2) Vegetable Farming and Post-harvest

Table 3.2 Training Curriculums for Vegetable Farming and Post-harvest

Category	Code	Subjects on Training Curriculum for Farmers	Sub-Code in PART-II: Manuals / Training Materials*	
			Manuals	Training Materials
Cropping Pattern Arrangement	FM-01	Cropping pattern arrangement	FM-01-01-E FM-01-01-H	FM-01-01-P FM-01-02-P FM-01-03-P FM-01-04-D
Cultivation techniques of vegetables and cereals	FM-02	Farm management	FM-02-01-E FM-02-01-H	FM-02-01-P FM-02-02-P
	FM-03	Land preparation and sanitation	FM-03-01-E FM-03-01-H	
	FM-04	Nursery production	FM-04-01-E to 05-E FM-04-01-H to 05-H	FM-04-01-P FM-04-02-P FM-04-03-P
	FM-05	Cultivation techniques for Summer vegetables	FM-05-01-E(1) to 12-E (2) FM-05-01-H(1) to 12-H(2)	FM-05-01-P to 08-P FM-05-09-D to 10-D
	FM-06	Cultivation techniques for Kharif cereals	FM-06-01-E (1)to (3) FM-06-01-H (1)to (3) FM-06-02-E (1) FM-06-02-E (2) FM-06-02-H (1) FM-06-02-H (2)	FM-06-01-P to 08-P FM-06-09-D
Harvest and Post-harvest Techniques of Kharif crops	FM-07	Harvest and post harvest of Kharif crops	FM-07-01-E FM-07-01-H	FM-07-01-P to 11-P FM-07-12-D
Cultivation techniques of vegetables and Rabi cereals	FM-08	Cultivation techniques for Winter vegetables	FM-08-01-E (1) to 14-E (2) FM-08-01-H (1) to 14-H (2)	FM-08-01-P to 03-P FM-08-04-D to 05-D
	FM-09	Cultivation techniques for Rabi cereal	FM-09-01-E (1) & (2) FM-09-01-H (1) & (2)	FM-09-01-P FM-06-04-P to 09-D
Harvest and Post-harvest Techniques of Rabi crops	FM-10	Harvest and post harvest of Rabi crops	FM-07-01-E FM-07-01-H	FM-07-01-P to 11-P FM-07-12-D
Value Added Cultivation	FM-11	Protected cultivation	FM-11-01-E to 04-E FM-11-01-H to 04-H	FM-11-01-P to 11-P FM-11-12-D to 16-D
	FM-12	IPM & IDM	FM-12-01-E & 02-E FM-12-01-H & 02-H	FM-12-01-P to 06-P
	FM-13	Safe use of agro-chemicals	FM-13-01-E FM-13-01-H	
	FM-14	Organic farming	FM-14-01-E to 03-E FM-14-01-H to 03-H	FM-14-01-P to 09-P FM-14-10-D to 14-D
	FM-15	Exotic and off-season vegetable cultivation	FM-15-01-E to 12-E	FM-15-01-P to 16-P FM-15-17-D to 18-D
Vegetable promotion	FM-16	Promotion of vegetable	FM-16-01-E	FM-16-01-P to 07-P FM-16-08-D to 13-D
Irrigation methods	FM-17	Irrigation methods	FM-17-01-E FM-17-01-H	FM-06-07-P

FM-01		
Title of Subject	:	***Cropping pattern arrangement***
Stage	:	Before first cropping season
Place	:	Each sub-project area
Target	:	All Farmers, Extension staff
Method	:	Lecture, Hands-on, Exposure Visit
Duration	:	One – two days
Resource Person	:	BPMU Officers
Key word	:	Existing cropping pattern, soil and climate condition, cropping pattern arrangement

Summary of training:

To provide suitable cropping pattern to concerned sub-project area, discuss existing cropping pattern, exact soil and climate condition for deciding crops. Most of farmers would newly start cultivation of vegetables so that detailed information should be provided.

Objective :

- To share necessary information on cropping pattern arrangement for farmers
- To provide suitable crops for cultivation to make farmers' profit maximum

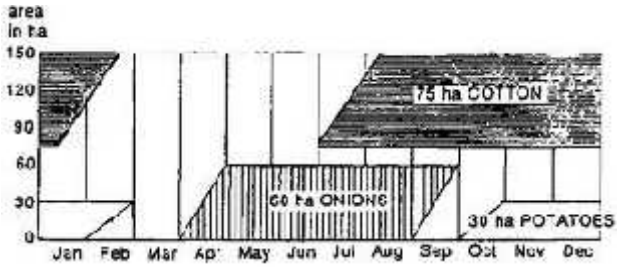
Contents of training:

Session 1: Result analysis of HHS
Session 2: Confirmation and discussion of existing cropping pattern
Session 3: Result analysis of soil test and climatic data (Agro-ecological zone)
Session 4: Detection of suitable crops for concerned are
Session 5: Making new cropping pattern suitable for concerned area

Materials /References

Topics /Source	Type	Code
Training manual on cropping pattern arrangement/JICA TCP	Booklet	FM-01-01-E & H
Theoretical Training on Cropping Pattern Arrangement	PPT	FM-01-01-P
Role of Macro and Microelements	PDF	FM-01-02-P
Disease management in vegetables	PDF	FM-01-03-P
Theoretical Training on Cropping Pattern Arrangement	DVD	FM-01-04-D
Result of soil test/DoA	Report	
Agro-ecological zone/DoA	Report	-

Image Photos of subject



FM-02		
Title of Subject	:	*Farm management*
Stage	:	Beginning and end of first cropping season
Place	:	Each sub-project area
Target	:	All farmers
Method	:	Lecture, Hands-on, Exposure Visit
Duration	:	One – two days
Resource Person	:	Extension staffs and/or community motivator
Key word	:	Book keeping, budget making, planning and result analysis

Summary of training:

Farmers are introduced to basic knowledge of accounting to keep record and calculate costs and profits

Objective :

- To impart the knowledge of book keeping to record expenses and incomes to calculate cost and profit for sound farm management
- Build capacity of farmers in farm management to make plan and analyze result

Contents of training:

Session 1: Basic knowledge for record keeping

Session 2: Categorization of costs(expenses) and profits(incomes)

Session 3: Making cost/estimate profit sheet for planning (Before first cropping season)

Session 4: Analysis of result (End of cropping season)

Session 5: Monitoring (Before and after every cropping season

Materials /References

Topics /Source	Type	Code
Manual for farm management /JICA TCP	Booklet.	FM-02-01-E & H
Worksheet for bookkeeping in Hindi	PDF	FM-02-01-P
Cost of cultivation for Tomato	PDF	FM-02-02-P

Image Photos of subject

FM-03		
Title of Subject	:	*Land preparation and soil sanitation*
Stage	:	Beginning of first cropping season
Place	:	Each sub-project area
Target	:	All farmers
Method	:	(Lecture), hands on, (exposure visit)
Duration	:	One – two days
Resource Person	:	Extension staffs and community motivator
Key Words	:	Field clearance, soil sanitation, tilling and application of basal manure

Summary of Trainings:

Farmers in HP tend not to practice sanitation of soil. However it is necessary procedure following clearance of former agriculture residues. Deep tilling is also necessary for cultivation of root vegetables. Application of basal fertilizer is indispensable for good growth of plants as results in good harvest.

Objective :

- To intimate the farmers importance of soil sanitation for sound crops
- To motivate farmers to till thoroughly and apply basal dose of fertilizer to improve growth of crops and their harvest

Contents of training:

Session 1: Clearance of agricultural residues of previous crop

Session 2: Practice of soil sanitation

Session 3: Appropriate tilling

Session 4: Adequate dose application of basal manure

Materials/ References	Topics/Source	Type	Code
	Manual on land preparation and sanitation /JICA TCP	Booklet	FM-03-01-E & H

Image Photos of Subject

FM-04

Title of Subject	:	*Nursery production*
Stage	:	Beginning of cropping season
Place	:	Each sub-project area
Target	:	All farmers, Extension Staff
Method	:	Lecture, hands on, exposure visit
Duration	:	One – two days
Resource Person	:	Experts from State University/KVKs / Extension staff
Key Words	:	Bed, tray, pot, plug tray, clay block nursery

Summary of Trainings:

General practice of sowing in HP is direct sowing in the fields. However provision of nursery can reduce amount of sowing seed, provide early production, improve growth of vegetables and increase survival rate in the field. At same time, it can be a good income generation to sell seedlings to neighborhood. There are several types of nursery production such as bed nursery, tray nursery, clay block nursery, pot and plug tray nursery

Objective :

- To promote nursery production to improve yield
- To create business chance by selling seedlings

Contents of training:

Session 1: Nursery bed preparation and use of tunnel

Session 2: Use of tray for compact, movable nursery production

Session 3: Pot and plug tray for early nursery production

Session 4: Clay block nursery production in simple way with muddy soil

Materials/ References	Topics/Source	Type	Code
	Manual on Nursery production /JICA TCP	Booklet	FM-04-01-E to 05-E
	Tips for Nursery Production and Management	PPT	FM-04-01-P FM-04-02-P
	New techniques for healthy nursery raising	PPT	FM-04-03-P
	Nursery production	PPT	

Image Photos of Subject

FM-05		
Title of Subject	:	*Cultivation techniques for summer vegetables*
Stage	:	Beginning of summer season
Place	:	Each sub-project area
Target	:	All farmers, Extension Staff
Method	:	Lecture, hands on, exposure visit
Duration	:	One – two days
Resource Person	:	Extension staffs
Key Words	:	Kharif fruit vegetables(tomato, brinjal, capsicum, cucumber, bottle gourd and bitter gourd, okra), root vegetables (ginger, turmeric, colocasia, elephant foot), leafy vegetables (leaf lettuce)

Summary of Trainings:

There are so many varieties of vegetables cultivated in Kharif season. In this training, improved/scientific cultivation techniques for open and protected condition with tips and hints are provided to farmers. Through lecture, visual aids help understanding of farmers to cultivate Kharif vegetables.

Objective :
- To impart techniques for Kharif vegetables with hints and tips to farmers
- To improve cultivation techniques for good harvest

Contents of training:

Session 1: Bed/ridge preparation, right times of sowing/transplanting
Session 2: Water and fertilizer application
Session 3: Weeding, earthing up and application of additional fertilizer
Session 4: Insect and disease control

Materials/ References

Topics/Source	Type	Code
Manual on cultivation of each vegetables /JICA TCP	Booklets	FM-05-01-E(1) to
Tips and Techniques for Summer Vegetable Cultivation	PPT	12-E (2)
Training on Kharif Season Crop Cultivation	PPT	FM-05-01-P
Kharif vegetable cultivation	PDF	FM-05-02-P
Insect pests in vegetables	PPT	FM-05-03-P
Insect Pests and Disease Management in Vegetables	PPT	FM-05-04-P
Insect pest and diseases management in kharif vegetabless	PPT	FM-05-05-P
Pest and disease control	PPT	FM-05-06-P
Training on Kharif Season Vegetables	DVD	FM-05-07-P
Training on Summer Season Vegetable Cultivation	DVD	FM-05-08-D
Training on Kharif season vegetables for extension staffs	DVD	FM-05-09-D
		FM-05-10-D

Image Photos of Subject

FM-06

Title of Subject	:	*Cultivation techniques for Kharif cereals*
Stage	:	Before summer season
Place	:	Each sub-project area
Target	:	All farmers, Extension Staff
Method	:	Lecture, hands on, exposure visit
Duration	:	One – two days
Resource Person	:	Extension staffs
Key Words	:	Maize and rice cultivation

Summary of Trainings:

Farmers in HP do not apply enough water and fertilizer except pre-sowing and basal manure. In this training, the information of on time water and fertilizer application will be given to farmers. If they apply them timely, the yield will be greatly improved. Cultural practices such as weeding and earthing up will also improve growth of crops and can increase yield. In case of rice, SRI cultivation techniques is also imparted to farmers though this is still new for HP.

Objective :

- To apprise farmers about benefits of on time application of water and fertilizers
- To intimate farmers the importance of cultural practice such as weeding and earthing up

Contents of training:

Session 1: On time sowing/transplanting
Session 2: Nursery production for rice
Session 3: On time application of water and fertilizers
Session 4: Cultural practice such as weeding and earthing up

Materials/ References

Topics/Source	Type	Code
Manual on Paddy Cultivation /JICA TCP	Booklet	FM-06-01-E (1)to (3)
Manual on maize cultivation/JICA TCP	Booklet	FM-06-02-E (1) & (2)
Cultivation of Maize	PPT	FM-06-01-P
Agro techniques of Paddy crop	PPT	FM-06-02-P
Agro techniques of Maize	PPT	FM-06-03-P
Balanced Fertilizer Use	PPT	FM-06-04-P
Insect pest in kharif crops	PPT	FM-06-05-P
Important Kharif and Rabi pulses	PPT	FM-06-06-P
Balanced Water Use – Irrigation	PPT	FM-06-07-P
Integrated Nutrient Management (INM)	PPT	FM-06-08-P
Improvement of food grains Productivity	DVD	FM-06-09-D

Image Photos of Subject

FM-07		
Title of Subject	:	*Harvest and post harvest of summer vegetables*
Stage	:	Before harvest season
Place	:	Each sub-project area
Target	:	All farmers
Method	:	Lecture, hands on, exposure visit
Duration	:	One – two days
Resource Person	:	Extension staff / Experts from State Marketing Board, from Cooperatives, Extension officers
Key Words	:	Right stage of harvesting, grading standard, right procedure of packing

Summary of Trainings:

To earn higher price in the market, on time harvest, sorting and grading are necessary. In addition, farmers need negotiation power towards buyers. For that purpose, group/cooperative collection and shipping is recommendable. Package is very important to sell produces in good condition and earn higher price in remote market.

Objective :

- To let farmers understand on time harvest, sorting and grading to earn higher price in the market
- To impart packing techniques to preserve freshness of vegetables during transportation and to add value to produce.

Contents of training:

Session 1: Right time harvesting of summer vegetables
Session 2: Sorting and grading to add value to produce
Session 3: Right procedure for packing and value addition by good package

Materials/ References

Topics/Source	Type	Code
Manual for post harvest techniques /JICA TCP	Booklet	FM-07-01-E & H
Marketing of vegetables	PPT	FM-07-01-P
Agricultural marketing	PPT	FM-07-02-P
Marketing Strategy for Safe and Quality Vegetables	PPT	FM-07-03-P
Case study of Lahalri	PPT	FM-07-04-P
Marketing strategy of high value vegetables	PPT	FM-07-05-P to 09-P
Harvest and Post-harvest Techniques	PPT	FM-07-10-P
Techniques for preservation of vegetable seeds	PPT	FM-07-11-P
Agricultural marketing	DVD	FM-07-12-D

Image Photos of Subject

FM-08

Title of Subject	:	*Cultivation techniques for winter vegetables*
Stage	:	Before winter crop season
Place	:	Each sub-project area
Target	:	All farmers, Extension staff
Method	:	Lecture, hands on, exposure visit
Duration	:	One – two days
Resource Person	:	Extension staffs
Key Words	:	Fruit(capsicum, French beans)/Flower(cauliflower, broccoli) vegetables, root vegetables(radish, turnip, carrot), leafy vegetables(leaf lettuce, cabbage, spinach, sarson), condiments (onion, garlic, fenugreek, coriander)

Summary of Trainings:

All techniques from land preparation to harvest are provided by visual manual with hints and tips and hands on training in the field.

Objective :

- To impart basic techniques for cultivation of winter vegetables
- To improve cultivation techniques for better harvest

Contents of training:

Session 1: Land preparation and basal fertilizer application
Session 2: Sowing and nursery production
Session 3: Cultural practice such as weeding and earthing up
Session 4: On time water and additional fertilizer application

Materials/ References

Topics/Source	Type	Code
Manual on each vegetable /JICA TCP	Booklets	FM-08-01-E (1) to 14-E (2)
New Techniques for Cultivation of Winter Season Crops	PPT	FM-08-01-P
Insect pests and disease management in Cole Crops, Root Crops and Leafy vegetables in Hindi (for farmers)	PPT	FM-08-02-P
Insect pests and disease management in Cole Crops, Root Crops and Leafy Vegetables (Extension staff)	PPT	FM-08-03-P
Training on tips and techniques of Winter vegetable cultivation	DVD	FM-08-04-D
Cultivation of Cole crops, Leafy vegetables and Root crops	DVD	FM-08-05-D

Image Photos of Subject

FM-09		
Title of Subject	:	*Cultivation techniques for Rabi cereal*
Stage	:	Beginning of Rabi crop season
Place	:	Each sub-project area
Target	:	All farmers, Extension staff
Method	:	Lecture, hands on, exposure visit
Duration	:	One – two days
Resource Person	:	Extension staffs
Key Words	:	Wheat cultivation, on time sowing, on time application of water and fertilizer

Summary of Trainings:

Present practice of cultivation of wheat in HP is only to apply basal manure and pre-sowing irrigation. To improve the yield, farmers need to apply additional fertilizer on specific stage for vegetative growth and reproductive growth. In addition, on time water application is effective to improve yield.

Objective :

- To inform farmers how to use additional fertilizer and water to improve yield
- To impart how to improve yield with hints and tips of cultural practice like earthig up

Contents of training:

Session 1: Importance of pre-sowing and land preparation
Session 2: Sowing
Session 3: On time application of water and additional fertilizer
Session 4: Disease and insects management

Materials/ References

Topics/Source	Type	Code
Cultivation manual on wheat cultivation /JICA TCP	Booklet	FM-09-01-E (1) & (2)
Wheat Cultivation	PPT	FM-09-01-P
Balanced fertilizer use	PPT	FM-06-04-P
Important Kharif and rabi pulses	PPT	FM-06-06-P
Balanced water use-irrigation.ppt	PPT	FM-06-07-P
Integrated Nutrient Management (INM)	PPT	FM-06-08-P
Improvement of Food grains Productivity	DVD	FM-06-09-D
Cultivation of Wheat	DVD	FM-09-09-D

Image Photos of Subject

FM-10

Title of Subject	:	*Harvest and post harvest of winter vegetables*
Stage	:	End of second cropping season
Place	:	Each sub-project area
Target	:	All farmers, Extension staff
Method	:	Lecture, hands on, exposure visit
Duration	:	One – two days
Resource Person	:	Extension staff / Experts from State Marketing Board, from Cooperatives
Key Words	:	Sorting, grading, packaging

Summary of Trainings: To earn higher price in the market, on time harvest, sorting and grading are necessary. In addition to such techniques, farmers need negotiation power towards buyers. For that purpose, group/cooperative collection and shipping is recommendable. Package is very important to sell produce in good condition and earn higher price in urban market.

Objective :

- To let farmers understand on time harvest, washing, sorting and grading to earn higher price in the market
- To impart packing techniques to preserve freshness of vegetables during transportation and to add value to produce.

Contents of training:

Session 1: Right time harvesting of Rabi crops

Session 2: Washing(if necessary), sorting and grading to add value to produce

Session 3: Right procedure for packing to keep freshness and value addition in good package

Materials/ References

Topics/Source	Type	Code
Manual for post harvest techniques /JICA TCP	Booklet	FM-07-01-E & H
Marketing of vegetables	PPT	FM-07-01-P
Agricultural marketing	PPT	FM-07-02-P
Marketing Strategy for Safe and Quality Vegetables	PPT	FM-07-03-P
Case study of Lahalri	PPT	FM-07-04-P
Marketing strategy of high value vegetables	PPT	FM-07-05-P to 09-P
Harvest and Post-harvest Techniques	PPT	FM-07-10-P
Techniques for preservation of vegetable seeds	PPT	FM-07-11-P
Agricultural marketing	DVD	FM-07-12-D

Image Photos of Subject

FM-11		
Title of Subject	:	*Protected cultivation*
Stage	:	Beginning of winter crop season
Place	:	Each sub-project area
Target	:	All farmers, Extension staff
Method	:	Lecture, hands on, exposure visit
Duration	:	One – two days
Resource Person	:	Extension staff / Experts from University, from KVKs
Key Words	:	Poly-house, insect net, shade net, micro irrigation, mulching, fertigation and pest management

Summary of Trainings: Effective use of poly-house and poly-tunnel are indispensable for production of off season vegetables. This training provides basic knowledge and skills of use of protected cultivation materials and techniques. In addition, pest and disease control in protected cultivation are imparted since it is closed environment and specific pests and diseases to manage.

Objective :
- To provide farmers practical techniques on protected cultivation
- To provide basic knowledge of materials for protected cultivation

Contents of training:

Session 1: Advantages of protected cultivation
Session 2: Use of poly-house, shade net, micro-irrigation system for cultivation
Session 3: Use of insect net for protection from strong sunshine and insects
Session 4: Use of mulch for preserving temperature and soil moisture, for protection from weed prevalence and soil derived insects and diseases

Materials/ References

Topics/Source	Type	Code
Manuals on protected cultivation /JICA TCP	Booklet	FM-11-01-E to 04-E
Poly house Technology and Crop Management	PPT	FM-11-01-P
Use of Mulch in Vegetables	PPT	FM-11-02-P
Grafting techniques & Cutting for improvement of veg. quality	PPT	FM-11-03-P & 04-P
Basic knowledge and skills for protected cultivation of veg.	PPT	FM-11-05-P
Crop cultivation in 100m^2 poly house	PPT	FM-11-06-P
Integrated pest and diseases management in pro. cultivation	PPT	FM-11-07-P
Fertigation, Irrigation & Greenhouse instrumentation	PPT	FM-11-08-P,09-P &10-P
Soil Health and nutritional aspects of protected cultivation	PPT	FM-11-11-P
Training on Protected Cultivation	DVD	FM-11-12-D
Training on Protected Cultivation and Post-harvest Activities	DVD	FM-11-15-D
Training on Basic Knowledge and Skills for pro. cult. of veg.	DVD	FM-11-16-D

Image Photos of Subject

FM-12

Title of Subject	:	*IPM*
Stage	:	Beginning of crop season
Place	:	Each sub-project area
Target	:	All farmers, Extension staff
Method	:	Lecture,
Duration	:	One – two days
Resource Person	:	Extension staff / Experts from University and from KVKs
Key Words	:	Pest identification, Use of cultural, physical, biological, behavioral and chemical management

Summary of Trainings:

Integrated pest management is an approach to control pests that consider all management options to maintain pests below an economic injury level. Methods for the management of pests include cultural, physical, biological, behavioral and chemical. With IPM, adverse effects of pesticides are minimized and economic returns are maintained.

Objective :

- To appraise farmers about benefits of IPM
- To create awareness and motivate farmers to go into IPM

Contents of training:

Session 1: What is IPM
Session 2: Cultural control (sanitation of field, use of off type and volunteer plants etc.)
Session 3: Biological control (natural enemy, pheromone trap, parasitiods, pathogens)
Session 4: Mechanical control (light trap, hand crash)

Materials/ References

Topics/Source	Type	Code
Manual on IPM & IDM /JICA TCP	Booklets	FM-12-01-E & 02-E
Integrated Disease Management	PPT	FM-12-01-P
Integrated Pest and Disease Management in protected cultivation	PPT	FM-12-02-P
IPM in protected & management in exotic vegetable crops	PPT	FM-12-03-P
Fungicides products approved for disease control	PDF	FM-12-04-P
Insecticides products approved for insect control	PDF	FM-12-05-P
New insecticides In India for vegetables crops	PDF	FM-12-06-P

Image Photos of Subject

FM-13		
Title of Subject	:	*Safe use of agro-chemicals*
Stage	:	Beginning of crop season
Place	:	Each sub-project area
Target	:	All farmers, Extension staff
Method	:	Lecture, hands on, exposure visit
Duration	:	One – two days
Resource Person	:	Extension staff
Key Words	:	Safe use of agro-chemicals for producers and consumers

Summary of Trainings:

Most of farmers in HP depends the selection of agro-chemicals on shop keepers. However they sometimes provide wrong information. To protect farmers themselves from danger of misuse or over use of agro-chemical, impart practical training from selection to preservation. It is one of the strategies to sell products in higher price.

Objective :

- To impart information on safe selection of agro-chemicals
- To create awareness of danger of agro-chemicals before use, during use and after use.

Contents of training:

Session 1: Safe selection of agro-chemicals

Session 2: Precaution for use

Session 3: Provision of gears for safe application of agro-chemicals

Session 4: Caution after use and safe preservation

Materials/ References	Topics/Source	Type	Code
	Manual on safe use of agro-chemicals /JICA TCP	Booklet	FM-13-01-E & H

Image Photos of Subject

FM-14

Title of Subject	:	*Organic farming*
Stage	:	Before cropping season
Place	:	Each sub-project area
Target	:	All farmers, Extension staff
Method	:	Lecture, hands on, exposure visit
Duration	:	One – two days
Resource Person	:	Extension staff / Experts from concerned institute
Key Words	:	Organic manure, organic liquid fertilizer, pest and disease control through organic pesticide

Summary of Trainings:

Farmers in HP are limited to access to agro-materials such as chemical fertilizers and insecticides. Although this is a limitation, they can change this situation to advantage if they practice organic farming. In this training, organic farming knowledge and techniques are provided to farmers for production of organic fertilizers and use of organic insecticide.

Objective :

- To impart information of organic farming
- To impart practical hands on training on production of organic manure and on use of organic insecticide

Contents of training:

Session 1: Advantages of organic farming
Session 2: Production of organic fertilizers
Session 3: Control of insects and diseases by organic way
Session 4: Cultural practice for organic farming

Materials/ References

Topics/Source	Type	Code
Manuals on organic farming /JICA TCP	Booklets	FM-14-01-E to 03-E
Bokashi, Vermi Compost and vermi wash preparation	PPT	FM-14-01-P & 02-P
Nadep Compost and CPP preparation, Matka Khad preparation	PPT	FM-14-03-P & 04-P
Marketing of organic produce	PPT	FM-14-05-P
Organic standards and certification- An Overview	PPT	FM-14-06-P
NPOP standards & ICS Documentation and record keeping	PPT	FM-14-07-P & 08-P
Grower group certification	PPT	FM-14-09-P
Hands-on training on organic manure preparation	DVD	FM-14-10-D
Hands-on training on bokashi and compost preparation	DVD	FM-14-11-D
Theoretical Training on Organic Farming	DVD	FM-14-12-D
Training on Organic Certification	DVD	FM-14-13-D

Image Photos of Subject

FM-15

Title of Subject	:	*Exotic and off-season vegetables cultivation*
Stage	:	End of second cropping season
Place	:	Advanced area of vegetable cultivation
Target	:	All farmers, Extension staff
Method	:	Lecture, hand holding, exposure visit
Duration	:	Two – 3 days
Resource Person	:	Extension staffs,
Key Words	:	Exotic and off-season vegetables, grafting, cutting, healthy nursery

Summary of Trainings:

To promote cultivation of exotic and off-season vegetables in new sub-project areas, farmers are familiarized with new agricultural techniques.

Objective :

- To intimate farmers with benefits of exotic and off-season vegetable cultivation by providing improved techniques
- To create awareness of importance of healthy nursery

Contents of training:

Session 1: Improved techniques of exotic and off-season vegetables
Session 2: New techniques of grafting and cutting of vegetable
Session 3: Production of healthy nursery (by using sand as media)
Session 4: Nutritional value and effect of vegetables to health

Materials/ References

Topics/Source	Type	Code
Exotic and off-season vegetable cultivation/JICA TCP	Booklet	FM-
Potential and scope of Exotic vegetable cultivation	PPT	FM-15-01-P
Vegetable cultivation in Japan	PPT	FM-15-02-P
Techniques for Improvement of Off-Season vegetable cultivation	PPT	FM-15-03-P
Exotic vegetable cultivation	PPT	FM-15-04-P
Off-Season vegetable cultivation	PPT	FM-15-05-P
Insect-pests and diseases of exotic vegetable crops	PPT	FM-15-06-P
Insect-pests and disease management in exotic vegetables	PPT	FM-15-07-P
Multiplication techniques of Exotic Vegetables crops	PPT	FM-15-12-P
Multiplication of exotic vegetables through grafting	PPT	FM-15-13-P
Introduction of present scenario of exotic and off season vegetable cultivation	PPT	FM-15-15-P
Training on exotic and off season vegetable cultivation	DVD	FM-15-17-D

Image Photos of Subject

FM-16

Title of Subject	:	*Promotion of Vegetable*
Stage	:	Mid of Rabi cropping season
Place	:	School or other institution
Target	:	School children, parents, teachers farmers and Extension staff
Method	:	Lecture, hand holding, exposure visit
Duration	:	1 day
Resource Person	:	Extension staffs (or invited lecturer)
Key Words	:	Nutritional value, health, local production and local consumption

Summary of Trainings:

To promote consumption of vegetables in local community, school children, parents, teachers and farmers are invited to the event to learn nutritional value of vegetables and how to use vegetables to improve health.

Objective :

- To familiarize vegetables and their use through play and demonstration of cooking
- To understand importance of vegetables for health by using Power points presentation

Contents of training:

Session 1: Child play with song and dance

Session 2: Power points presentation on how to combat diabetes, high blood pressure and anemia

Session 3: Demonstration of cooking of vegetables

Materials/ References

Topics/Source	Type	Code
Manual and reports on promotion of vegetable/JICA TCP	Booklets	FM-16-01-E
How to combat with diabetes, high blood pressure, anemia by utilizing vegetables	PPT	FM-16-02-P, 03-P & 04-P
Introduction to exotic vegetables and recipes	Hand-outs	FM-16-06-P
Implementation schedule of crop diversification plan in Kangra, Hamirpur and Mandi district	PPT	FM-16-07-P
Preparation of dishes utilizing exotic vegetables	Demonstration	
Vegetable promotion workshop	DVD	FM-16-09-D
Promotion of vegetable consumption	Drama (Play with songs)	FM-16-05-P

Image Photos of Subject

FM-17		
Title of Subject	:	*Exposure visit to advanced area*
Stage	:	End of second cropping season
Place	:	Advanced area of vegetable cultivation
Target	:	All farmers, Extension staff
Method	:	Lecture, hand holding, exposure visit
Duration	:	Two – 3 days
Resource Person	:	Advanced farmers, extension staffs,
Key Words	:	Good cultivation practice, marketing strategy

Summary of Trainings:

To promote cultivation of vegetables in new sub-project areas, farmers are brought to advanced area to learn agricultural techniques and marketing of produces through field experience.

Objective :

- To apprise farmers about benefits of vegetable cultivation and marketing
- To create awareness and motivate farmers to undertake group marketing

Contents of training:

Session 1: Advantages and constraints of group marketing.

Session 2: Models (Cooperative/Society/Farmer Clubs etc.) modalities of group marketing

Session 3: Visit to organization undertaking group marketing

Session 4: Brand building and quality control under group marketing.

Materials/ References	Topics/Source	Type	Code
	Reports of Exposure Visit to Advanced Area /JICA TCP	Reports	
	Recordings of discussions with advanced farmers	DVD	FM-16-10-D, 11-D, 12-D & 13-D

Image Photos of Subject

(3) SHG Development

Table 3.3 Training Curriculums for SHG Development and reference materials in the guideline for training of SHGs

Category	Curriculum Code	Subjects on training curriculum for farmers	Sub-Code in PART-II: Manuals / Training Materials	
			Manuals / training materials	Reference for trainer
SHG development and suppor	GD-01	Orientation and preparation workshop for SHG	GD-01-03 GD-01-02 GD-01-21	GD-03-01 GD-03-02 GD-03-03 GD-03-04
	GD-02	Training of SHG members on Credit management	GD-01-04 GD-01-19	GD-03-03 GD-06-01 GD-06-02
	GD-03	Training of office bearers of SHG on book-keeping and accounts	GD-01-04 GD-01-20	
	GD-04	Training of Women members on leadership, communication, participation etc	GD-01-06 GD-01-07	
	GD-05	Training of - organic fertilizer - seedling raising - food processing	GD-01-08 GD-01-09 GD-01-10 GD-01-11 GD-01-14 GD-01-15	GD-03-13
	GD-06	Training of budget making and monitoring for SHG_	GD-01-16	GD-01-12 GD-01-13 GD-03-06a GD-03-06b
	GD-07	Workshop of SHG members on Promotion and management of business micro enterprises	GD-01-17 GD-01-18	GD-03-07 GD-03-08

GD-01		
Title of Subject	:	*Orientation and preparation workshop for SHG*
Stage	:	At the beginning of the project intervention
Place	:	Each sub-project area
Target	:	Existing SHGs and other interested people to form SHGs
Method	:	(Lecture), Hands-on, Exposure Visit
Duration	:	Half-day
Resource Person	:	BPMU Officers
Key word	:	SHG formation, basic functions of SHGs

Summary of training:

As an introduction of the project intervention, project outline and potential support from the project shall be explained. Training emphasize on motivating SHGs to participate in the project scheme and non-members to join SHG or to form new SHGs. Although this training is introduction, basic functions of the SHG such as formulation of proceedings, rules, organization of meetings, etc shall be established with close support and follow-up by the community motivators.

Objective :

- To introduce the project scheme
- To motivate for SHG formation and group activities
- To introduce necessary functions of SHGs

Contents of training:

Session 1: Introduction of the project outline
Session 2: Formation/selection of SHGs for project support
Session 3: Motivation raising for implementing group activities
Session 4: Guidance on establishment of basic functions of SHGs (by-law making, roles and responsibilities of members, organising regular meetings and record of proceedings.

Materials	Name/Source	Type	Sub-Code
	SHG Development and support training module (Section 2) Orientation Workshop for SHGs /JICA TCP	Book	GD-01-01 Section 2,
	Responsibility of members and regular meeting (Hindi) /JICA TCP	PPT/Handout	GD-01-03
	Sample form of SHG by-law / JICA TCP	Handout	GD-01-02
	Success story of SHG	Audio video	GD-01-21
References	Institutional development support strategy / JICA TCP	PPT	GD-03-01
	SHG Development and Support – Activity Planning	PPT	GD-03-02
	SHG Development and Support – SHG Formation	PPT	GD-03-03
	SHG Formation / Dr. Pradeep	PPT	GD-03-04
	Training Manual on Self-Help Groups for Micro-Enterprise Development/ Haryana Forest Department	Book (Copy)	GD-06-01
	A Handbook on Forming Self-Help Groups / NABARD	Book (Copy)	GD-06-02

Image Photos of subject



GD-02

Title of Subject	:	*Training of SHG members on credit management*
Stage	:	After establishment of basic functions of the SHG
Place	:	Each sub-project area
Target	:	SHG members or SHG officials
Method	:	Lecture, Hands-on, Exposure Visit
Duration	:	Half-day
Resource Person	:	BPMU officers
Key word	:	Interloaning, record keeping

Summary of training:

Inter-loaning is one of the common practices of SHGs. What is important in management of inter-loaning is proper record keeping and rules of loaning in the group. The training focus on discussion for making rules on inter-loaning with support of facilitator and practice of record keeping for saving and loan. Practical session of inter-loaning record keeping utilizing teaching kit is important. Handout for the SHG members to refer after the training shall help their practice.

Objective :

- For the SHG officials to understand how to record their inter-loaning transaction
- SHG to start preparing their own inter-loaning record
- SHG to set their rules of inter-loaning

Contents of training:

Session 1: Setting rules on inter-loaning

Session 2: Principals and practice of saving record

Session 3: Principals and practice of loan record

Materials	Name/Source	Type	Sub-Code
	SHG development and support training module (Section 3) Training on Credit Management /JICA TCP	Book	GD-01-01 Section 3
	Inter-loaning record (Hindi) / JICATCP	PPT/Handout	GD-01-04
	Inter-loaning record keeping teaching kits	Banner and practice kit	GD-01-19
References	Training Manual on Self-Help Groups for Micro-Enterprise Development/ Haryana Forest Department	Book (Copy)	GD-06-01
	A HANDBOOK ON FORMING SELF-HELP GROUPS(SHGs) /NBARD	Book (Copy)	GD-06-02

Image Photos of subject

GD-03		
Title of Subject	:	*Training of book keeping for SHG /* *Training of office bearers of SHG on bookkeeping and accounts*
Stage	:	When the SHG start any financial transaction
Place	:	Each sub-project area
Target	:	SHG officials and members
Method	:	(Lecture), (hands-on), exposure visit
Duration	:	Half-day
Resource Person	:	BPMU officers
Key Words	:	Basic accounting, book keeping

Summary of training:

Accounting and book keeping is vital issue for the groups that handle any money transaction. SHG members, not only the treasurer, should understand their financial situation. The training focus on principles of accounting and bookkeeping along with practical of bookkeeping. Practice is very important for the participants to digest their learning, especially for those are new to bookkeeping. Therefore enough time shall be spared for practice to let them become able to record by themselves, even though the follow-up of their actual recording is necessary.

Objective :

- For the SHG members to recognize importance of book keeping and accountability
- SHG members to equip with the basic book keeping skills
- SHG members to establish monitoring of their finance as collective responsibility

Contents of training:

Session 1: Introduction of accounting and bookkeeping
Session 2: Presentation on importance of accounting and maintenance of bookkeeping
Session 3: practical session of cashbook entry

Materials	Name/Source	Type	Sub-Code
	SHG development and support training module (Section 4) Training on Accounting and Book Keeping /JICA TCP	Book	GD-01-01 Section 4
	Cashbook keeping (Hindi) /JICA TCP	PPT/Handout	GD-01-05
	Cashbook keeping teaching kit / JICA TCP	Banner and practice kit	GD-01-05
References	Training Manual on Self-Help Groups for Micro-Enterprise Development/ Haryana Forest Department	Book (Copy)	GD-06-01
	A HANDBOOK ON FORMING SELF-HELP GROUPS(SHGs) /NBARD	Book (Copy)	GD-06-02

Image Photos of subject

GD-04

Title of Subject	:	*Training of Women members on leadership, communication and participation*
Stage	:	At the early stage of the activity and periodically as per need
Place	:	Each sub-project area
Target	:	SHG members
Method	:	Lecture, hands-on, exposure visit
Duration	:	Half-day
Resource Person	:	BPMU officers
Key Words	:	Group management, planning, budgeting, monitoring

Summary of training:

Management of works is a crucial issue to make the group function and to sustain the activities. Management dealt in the training includes;

- How to manage group works (planning of activities, division of work)
- Conflict management
- Leadership development

Objective :

- For the SHG members to recognize importance of planning their works
- SHG members to become able to organize their work and responsibility among their members
- SHG members to equip basic skills to budget their activities and monitor the cash flow

Contents of training:

Session 1: Planning activities and organizing their work and responsibility

Session 2: Conflict management

Session 3: Budgeting and monitoring of their cash flow

Materials	Name/Source	Type	Sub-Code
	SHG development and support training module (Section 5) Training on Group Management/JICA TCP	Book	GD-01-01 Section 5
	Conflict management in a group (Hindi) /JICA TCP	PPT/Handout	GD-01-06
	Leadership management (Hindi) /JICA TCP	PPT/Handout	GD-01-07
References	Experience of Laharli SHG	PDF/PPT	GD-03-13

Image Photos of subject

GD-05

Title of Subject	:	*Training of organic fertilizer, seedling raising, food processing*
Stage	:	Depending on the choice of the activity
Place	:	Each sub-project area
Target	:	SHG members
Method	:	Lecture, hands-on, exposure visit
Duration	:	Half-day
Resource Person	:	BPMU officers, technical officer of the activity of choice
Key Words	:	Processing, income generation, group activity

Summary of training:

Prior to organizing technical trainings, the community motivators to discuss with the SHG members to identify needs and preferred processing activities for the SHG members to choose. The activities to be covered in the training depend on the choice of the SHGs. Nursery making and food processing activities are dealt as examples. In whatever activity, the training cover theoretical knowledge and practical skill development.

Objective :

- For the SHG members to understand and equipped with basic knowledge about the activity of their choice.
- SHG members to equip with the skills for the activity
- SHG members to practice their activity

Contents of training:

Session 1: Introduction of the concerned activity
Session 2: Lecture on the basic knowledge regarding the activity (e.g. nutritional value, storage and packaging for food processing, Daily care and pest control measure for seedling, etc.
Session 3: Practical session for the activity of their choice
Session 4: Way forward to implement the activity in their group

Materials	Name/Source	Type	Sub-Code
	SHG development and support training module /JICA TCP (Section 6) Training on Post Harvest, Processing and other Income Generation Activities (Section 7) Training on Value addition to the vegetable	Book	GD-01-01 Section 6 Section 7
	Pest control measure for Nursery cultivation / JICA TCP	Handout	GD-01-08
	Balanced diet and Nutrition (Hindi) / JICATCP	PPT	GD-01-09
	Bari and Papad making /JICA TCP	Handout	GD-01-10
	Food processing booklet	Booklet	GD-01-11
	Mulberry Processing / JICA TCP	PPT/Handout	GD-01-14
	Mulberry leaves health value / JICA TCP	PPT/Handout	GD-01-15
Materials	Food poisoning and its prevention (Eng) / Practical Action	PDF	GD-01-12
	Making safe food (Eng) / Practical Action	PDF	GD-01-13

Image Photos of subject




GD-06

Title of Subject	:	*Training on budget making and monitoring for SHG*
Stage	:	After starting production
Place	:	Each sub-project area
Target	:	SHG members
Method	:	Lecture, hands-on, exposure visit
Duration	:	Half-day
Resource Person	:	BPMU officers, technical officer of the activity of choice
Key Words	:	income generation, budgeting, group activity

Summary of training:

Cost calculation and price setting are crucial aspect when SHG establish income generation activities. Products of the SHG should be profitable to make the production activities sustainable. Although proper calculation might be complicated for less capable SHGs, it is necessary for them to have idea. Training should be conducted with practice on their actual activities, working on example together within the training session.

Objective :

- For the SHG members to understand principles of budgeting.
- SHG members to equip with the knowledge of cost calculation and pricing
- SHG members to become able to choose profitable products or to make their product profitable

Contents of training:

Session 1: Cost calculation of the production cost and budgeting
Session 2: Pricing of products
Session 3: Sales management

	Name/Source	Type	Sub-Code
Materials	SHG development and support training module (Section 8) Training on Budgeting and financial management /JICA TCP	Book	GD-01-01 Section 8
	Budgeting and pricing (Hindi)/JICA TCP	PPT/Handout	GD-01-16
References	Budgeting (Eng) / JICA TCP	PPT	GD-03-07
	Pricing (Eng) /JICA TCP	PPT	GD-03-08

Image Photos of subject

GD-07		
Title of Subject	:	*Workshop of SHG members on Promotion and management of business micro enterprises*
Stage	:	After production activities are established
Place	:	Each sub-project area
Target	:	SHG members
Method	:	Lecture, hands-on, exposure visit
Duration	:	Half-day
Resource Person	:	BPMU officers,
Key Words	:	Small and micro enterprise, business management

Summary of training:

As most of SHG members are not very familiar with business in terms of profitability, sustainable production and responsibility on their products. The training shall focus on creating business mind of the participants instead of pushing them for profit making. The training contents shall be adjusted in consideration of the level of SHGs, production capacity, readiness for business operation.

Objective :

- For the SHG members to understand what business is.
- SHG members to have idea on what type of business they want to develop for their SHG, and be able to make their business plan
- SHG members to equip with basic skills to run their small business

Contents of training:

Session 1: Basic concept of microenterprises development
Session 2: Developing business strategy and business plan
Session 3: Marketing strategies of SHG products

Materials	Name/Source	Type	Sub-Code
	SHG development and support training module (Section 9) Training on Promotion and Management of Business Microenterprise /JICA TCP	Book	GD-01-01 Section 9
	Business plan and marketing for SHG (Hindi) / JICA TCP	PPT/Handout	GD-01-17
	Sample Business plan (Hindi) / JICA TCP	Handout	GD-01-18
References	General Concept of microenterprise development (Eng) / JICA TCP	PPT	GD-03-09
	Business planning (ENG) / JICA TCP	PPT	GD-03-10
	Marketing strategy for Microenterprise (ENG) / JICA TCP	PPT	GD-03-11
	Application of Business management to SHG (Eng) /JICA TCP	PPT	GD-03-12
	'GET Ahead for women in enterprise training package and resource kit'/ ILO	Book	GD-06-03

Image Photos of subject

(4) Marketing

Table 3.4 Training Curriculums for Marketing

Category	Code	Subjects on Training Curriculum for Farmers	Code in PART-II: Manuals / Training Materials
Improvement of vegetable marketing	MK-01	Basic information of marketing system/issues	MK-01
	MK-02	Advanced concept for better marketing	MK-02
	MK-03	Group marketing	

MK-01		
Title of Subject	:	***Basic information of marketing system/issues***
Stage	:	End of first cropping season
Place	:	Each sub-project area
Target	:	All Farmers
Method	:	Lecture, Hands-on, Exposure Visit
Duration	:	One – two days
Resource Person	:	BPMU Officers
Key word	:	Cost of cultivation, Grading/packing, Price of vegetables, Market convension of APMCs

Summary of training:

Few of the farmers may not have prior experience of growing vegetables commercially in the majority of sub-project areas under JICA ODA Project. As part of the capacity development under ODA Project, training on marketing for these farmers is necessary. This training aims to create awareness amongst farmers about agricultural marketing process.

Objective :

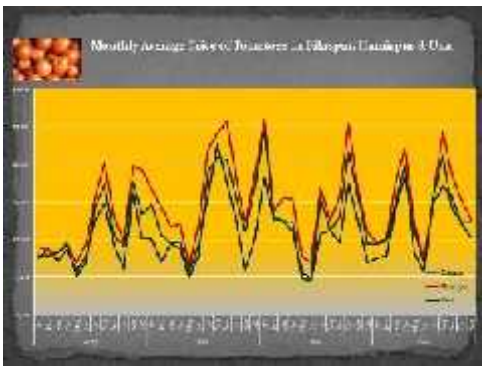
- To share necessary information on agricultural marketing for farmers
- To provide agricultural marketing rules and other useful information related to selling of produce in APMCs

Contents of training:

Session 1: Importance of grading and packing in marketing of vegetables
Session 2: Information on marketing of produce and conventions in APMCs
Session 3: Price-trends based on monthly-average prices from APMCs
Session 4: Demonstration of grading/packing skills
Session 5: Calculation of cost of cultivation of vegetable crops

Materials /References	Topics/Source	Type	Code
	Agricultural Marketing Handbook /JICA TCP	Book	Under preparation
	Training material of Marketing	P.P.	AM-01 AM-05 to AM-07
	http://agmarknet.nic.in/ /DMI, DoA	Web	-

Image Photos of subject



MK-02		
Title of Subject	:	*Advanced concept for better marketing*
Stage	:	End of first year or two cropping seasons
Place	:	Each sub-project area
Target	:	Selected farmers
Method	:	(Lecture), Hands-on, Exposure Visit
Duration	:	One – two days
Resource Person	:	Experts from Agriculture Universities, State Marketing Board
Key word	:	Quality control, certification, marketing intelligence, post-harvest processing, GAP

Summary of training:

Farmers with some experience of growing vegetables commercially are introduced to advanced concepts of marketing such that they produce quality produce and target niche markets.

Objective :

- To share information on marketing (quality control, certification of produce & other contemporary subjects of marketing) with focus on niche markets ensuring premium prices.
- Build capacity of farmers in processes of post-harvest and marketing of produce.

Contents of training:

Session 1: Quality Control Standards in Vegetables
Session 2: Primary Value Addition
Session 3: Organic Certification Process
Session 4: Marketing Intelligence and Market Information Systems
Session 5: Basic methods of processing and value addition (grading / sorting / packing)

Materials /References	Topics/Source	Type	Code
	Training Materials on price and marketing for advanced farmers	Book/P.P.	AM-03 AM-04 AM-07
	http://agmarknet.nic.in/ /DMI, DoA	Web	-

Image Photos of subject

MK - 03		
Title of Subject	:	*Group Marketing*
Stage	:	End of first growing season
Place	:	Each sub-project area
Target	:	All farmers
Method	:	Lecture, hand holding, exposure visit
Duration	:	One – two days
Resource Person	:	Experts from State Marketing Board, from Cooperatives
Key Words	:	Group marketing, quality, brand building

Summary of Trainings: Farmers in HP have small land holdings; the produce is limited and transaction cost of marketing is high per unit produce. Group marketing ensures lower transaction cost for marketing, high bargaining power, and farmers while ensuring quality of produce build a brand that ensures a premium price in the market.

Objective :

- To apprise farmers about benefits of group marketing & explain the process
- To create awareness and motivate farmers to undertake group marketing

Contents of training:

Session 1: Advantages and constraints of group marketing.

Session 2: Models (Cooperative/Society/Farmer Clubs etc.) and modalities of group marketing

Session 3: Visit to Organization undertaking group marketing

Session 4: Brand building and quality control under group marketing.

Materials/ References

Topics/Source	Type	Code
Materials on agricultural marketing	Book/P.P.	AM-01, AM-02 AM-06
Lahaul Potato Society		
Satluj Flower & Vegetable Growers Society		

Image Photos of Subject

CHAPTER 4

LESSONS LEARNED

4.1 Outline of the Pilot Activities

Lahalri pilot area (size: 28ha) in Hamirpur District, H.P. was selected to promote crop diversification in cooperation with farmers and farmer groups under JICA Technical Cooperation Project (TCP). In the pilot area, first of all, irrigation facilities were constructed, in parallel with institutional organization for operation and maintenance of the irrigation facilities, involving Water User's Associations (KVA). Furthermore, technical training programs were undertaken for farmers as well as farmers' groups during the period of construction as well as after completion of construction. Further experience as well as knowledge should be applied for promotion of crop diversification in ODA loan project as well as DoA schemes. In this pilot area, JICA TCP has various activities for infrastructure development as well as training of farmers as follows:

Table 4.1 Outline of Major Activities in Lahalri Pilot Area

Component	Activity	Target	Time Frame
(1) Infrastructure Development	Planning/Survey/Design works Construction of new facilities	Gross area: 28ha Irrigable land : 24ha Gravity irrigation Sprinkler irrigation Poly houses (6 nos., 40m^2/no)	
(2) Training program of farmers	- Formulation of Water Users' Groups	98 Farmers for Lahalri pilot area	During construction work
	- Strengthening Water Users' Group		During and after construction work
	- Operation and maintenance of irrigation facilities - Water management - Farming practices - Activities of Self-Help Groups - Marketing		After construction work
(3) Demonstration plots	- Technical support on vegetable cultivation in open fields - Technical support on vegetable cultivation in 6 poly houses	Demonstration farmers	After construction work

In this chapter, lessons learned from pilot activities under TCP are summarized. These lessons learned are expected to be referred by the extension officers of PMU or DoA and utilized for project implementation under JICA ODA Loan or other similar activities.

4.2 Lessons Learned in Infrastructure Development

(1) Planning

Lessons Learned from the Pilot Project	Photo
☐ Engineers should carefully **confirm submerged area in the poundage water** by construction of intake structure in order to avoid the damage to existing structures (Photo 1). ☐ Engineers should obtain **farmers consensus with various approaches** for better understanding. It could prevent unnecessary dispute or trouble with farmers (Photo 2). ✓ Briefing/meeting of plan ✓ Site briefing with farmers ✓ No Objection Certificate (NOC) ✓ Joint site survey with representative of farmers ✓ Use of white lines to show pipeline alignment and structure plan ☐ Engineers should use **stable and fixed benchmarks** for detailed topographic survey in the site (Photo 3). ✓ Permanent structures or rocks for benchmarks or control points of topographic survey ✓ Location without removal by excavation during construction work for benchmarks or reference point	 1. Personal pump chamber at upstream of the intake  2. Pipeline alignment by white powder in the site  3. Setting out in the pump House

(2) Design

Lessons Learned from the Pilot Project	Photo
Engineers should check the following points for designing work of irrigation facilities. *(1) Intake structures* (Weir, feeder channels, sump well and pump house) ☐ Downstream apron length of weir should be determined by **Bligh's method**. ☐ You should **keep a certain distance between the outlet of feeder channels and suction pipes in sump well** to avoid air bubbles. ☐ Pump house should be **located above the flood level** to prevent damages to the structure and machineries. *(2) Pipelines* ☐ **Stand air pipes** should be installed at 1) downstream side of tanks, 2) changing point of pipelines from shallow to steep pitch and 3) middle point of long and shallow pipelines. ☐ At location with steep slopes (10-15 degrees) in pipeline, **concrete barriers** should be constructed with 10 to 15 m interval for protection of soil erosion & gulley formation ☐ **Connection of hydrant pipe** for sprinkler system should be kept in 15 cm from ground level for easy connection. ☐ **Sluice valves** shall be installed for water stopping purpose and **butterfly valves** do so for adjustment of water flow. ☐ For safety and smoothness of pipelines, **soil with 10 cm depth** should be placed at the base. ☐ The pipes should be backfilled with **uniform particle size soil**. You should not use soil mixed with stones or organic matters. ☐ **Minimum depth of backfilled soil** of pipelines should be 60cm. *(3) Tanks and outlets* ☐ **Control valves for maintenance purpose** should be installed at downstream of each tank. ☐ **Roof cover** should be installed in case the tank is located under the tree ☐ **Flush valve** should be installed in water storage tank for cleaning purpose.	

Lessons Learned from the Pilot Project	Photo
You are recommended to **decide 1) lines style and 2) classification of layers** before preparing the drawings with AUTOCAD. Please refer the following classifications of lines and layers. *Line styles* ✓ **Continuous line** for Line indicating the visible portion, Dimension line, Lead line, Outline, etc., ✓ **Broken line** for Lines indicating the shape of the invisible part, ✓ **Alternate long and short dash line** for Center line, Section line, base line, boundary line, etc., etc. *Classification of layers* ✓ Title (Outline, Title Block, Ruled line, Character, Frame of Longitudinal Figure), ✓ Back Ground of Drawing (Contour, Status feature, Existing structures), ✓ Bench Mark (Reference point, Benchmark, Width pile, etc.), ✓ Structure (Structure represented by the drawing name), ✓ Byproduct (Structure derived from the main structure), ✓ Material (Cut earth and Embankment, Concrete, Reinforcement, Quantities, Specifications, etc.), ✓ Decoration (hatching, symbol, mark, etc.), ✓ Document (Description, instructions, location diagram), ✓ Survey (Survey results, such as topographic maps), etc. (Refer to Ministry of Agriculture, Forestry and Fisheries standards in Japan)	

(3) Construction Management

Lessons Learned from the Pilot Project	Photo
1) Schedule Control ☐ You should **check the details of constraction schedule together with contractor** based on the work schedule prepared by contractor before starting construction. ☐ **Setting out the structures in the site** should be carried out immediately after signing the contract (Photo 1). ☐ You should have **regular meeting with contractor** at least once a week to review progress of work (Photo 2). The check point of regular meeting is as follows: ✓ Progress of work ✓ Difference between the plan and actual progress ✓ Reasons of the difference of progress ✓ Countermeasures to catch up the progress ☐ You should **handle carefully objections from farmers** at the construction stage to prevent delay due to it (Photo 3). ☐ You should keep all of the record and instruction to the contractor in a paper. When you make an instruction to the contractor, you should use **"Instruction Slip"**.	 1. Set out in the site  2. Regular Meeting  3. Discussion with farmers in the site

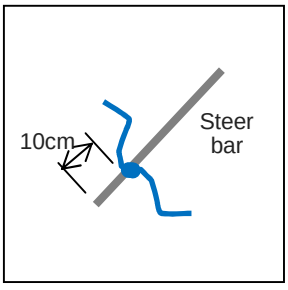
Lessons Learned from the Pilot Project	Photo

2) Progress Control

- ☐ **Work progress should be measured directly** at the site by contractor and be approved by the Engineer. The record of progresses shall be kept in **"measurement book"** with signature of both sides. Progress payment will be done based on the record of measurement book (Photo 1 to 3).
- ☐ When contractor proceeds to the next step of construction work, **the contractor should get prior approval by the Engineer** for completion part of the construction.
- ☐ **Work progresses should be kept in a record of photos**. These photos will be evidences of quality of structure and references for operation and maintenance (Photo 4 to 5).

Direct Measurement of excavation quantity

Direct Measurement of elevation by water tube



Direct Measurement of base sand depth

1. Measurement Inspection

2. Measurement Inspection

3. Measurement Inspection

4. Photograph Recording (Spacing of reinforce bars)

5. Photograph Recording (Cover and formwork spacing)

Lessons Learned from the Pilot Project	Photo
3) Quality Control *(1) Concrete work* ☐ To check the **diameter of reinforce bar, spaces between bars, width of formworks and covering depth of reinforce bar** before placement of concrete. ☐ To check **oil for removal** of formworks and **cleaning** inside formworks before placement of concrete. ☐ To check the **mixing concrete** at the site when the contractor places concrete (Photo 1). ☐ To **use vibrator** for concrete placement. Vibrator should be inserted in the concrete upright, every 50 cm, 5 to 15 seconds per a place (Photo 2). ☐ To **cure the concrete** carefully. You should start curing the concrete immediately after the surface becomes hardened. You should keep the **concrete surface wet continuously for at least 7 days** (Photo 3). ☐ To use spacer for formwork made by mortar or concrete which is stronger than the body concrete. ☐ To **place supporting reinforce bars** where a pipe penetrates the concrete (Photo 4). ☐ Height of concrete placement should be **less than 1.5 m**. ☐ Joint part of reinforce bars should be **more than 30 ϕ** , where ϕ is diameter of reinforce bars.	 1. Check mix of concrete  2. Use vibrator  3. Curing  4. Supporting reinforce bars

Lessons Learned from the Pilot Project	Photo
(2) Pipeline ☐ **Test for water leakage** should be carried out at the connection points of all pipes before backfilling. ☐ Depth of base sand should be checked before the installation of pipes. ☐ **Terminal part of the pipes should be covered** with cement bags etc. for preventing animals from entering into the pipes (Photo 1). ☐ You should **prevent erosion of soil with sand bags** after backfilling especially at borders of farm land and existing drainage canals (Sand bags). *(3) Others* ☐ **Foundation (Bearing Strata) for structures should be checked carefully** before starting construction. Intake weir, feeder channel and pump house should be located on strong foundation.	 1. Terminal cover  2. Sand bags for preventing the erosion

Lessons Learned from the Pilot Project	Photo
4) Safety Control ☐ **Safety fence** should be placed at the location around deep excavation (Photo 1). ☐ In case the excavation crosses existing road or footpath, you should place a **temporary road**. ☐ **No-entry signs** should be placed for preventing people to enter the construction site. ☐ Every person including labors in the construction site should **wear helmets** for preventing an accident and injury.	 1. Safety fence

(4) The History in Lahalri (Various happening under Construction of Lahlri Pilot Area)

During the construction period, we spent valuable time with farmers in Lahalri as well as other relevant people. Herein we would like to share our experience in the Lahalri pilot area with you.

The construction of irrigation facilities that had started from November 2011, was supposed to be completed in a construction period of four months. However it was significantly delayed, and the completion certificate was issued by the contractor in November 2012. Overall, it required 12 months. During construction period, various experiences between the client; Japan International Cooperation Agency-Technical Cooperation Project (hereafter referred to as "TCP"), the contractor, and beneficial farmers were compiled. A directly useful guideline was prepared for core extension officers engaged in the projects of ODA loans to implement the irrigation facilities development through the experiences of the pilot area of Lahalri.

The following highlights the experiences gained during the construction management period at the pilot area in Lahalri.

After signing of the contract, mobilization was delayed by the contractor for a period of two weeks, a warning letter was sent to the contractor. The person who has experiences and the authority about construction management specified in the contract rarely attended weekly progress meetings. In fact, those who attended in the weekly progress meetings did neither have any experience of the construction management, nor the authority to use the money for construction related works. They could not timely and flexibly respond in the site, because the parson who had the authority was sitting at the branch office that is 30 km away from the construction site. Although the TCP always requested to improve this point several times, they did not change it.

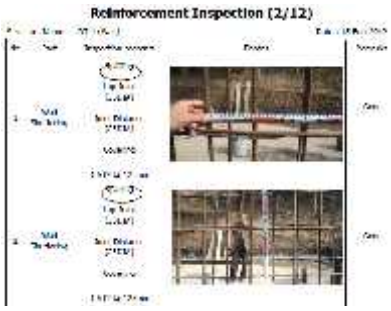

Weekly meeting

Under these situations, construction work has proceeded. The weekly progress meetings focused on explanation of progress in the previous week and the detail working plan in the following week. The progress of the previous week was described with reasons of the delay by the site engineer, and TCP the contractor let come up with the future improvement plan. The construction schedule with specified activities for the following week was prepared by the contractor. For example, the arrangement for pouring concrete: installing of concrete mixer, preparation of shuttering, securing of laborers and material, transport of material in site, etc. TCP enquired them the detail procedure to discuss whether the plan is feasible or not. Modification and alteration were carried out necessary. However, those construction

schedules were rarely followed in the construction site even after the elaboration meetings as mentioned above.

In the beginning, the contractor had often proceeded without the consent of TCP. The following items should be inspected at site; reinforcement (cover, diameter, space, etc.) and shuttering, before pouring concrete, laying pipe and leakage before backfilling, backfilling material (soil which does not include stones and organic, etc.) etc. The engineers in charge of the Department of Agriculture (hereafter referred to as "DoA") hardly carried out the site inspection due to lack of engineers or transportation. The construction management and site inspection were entrusted to the contractor. However, the contractor was not aware of site inspection. TCP, therefore, began by telling them the importance of construction management. TCP explained several times that they should obtain the approval from TCP and TCP should inspect the facilities before proceeding to the following step of the construction. TCP heard from the contractor, "We got a good experience. Because we had not previously executed such a management on a construction work, and if we had some question and issue that could not be solved by ourselves, we would immediately contact TCP to get some instruction. TCP has assisted us regarding quality." As described above the site inspection became.

TCP also introduced recording method of site inspection using photographs. This is one of the quality evidences for adequateness of the construction work. This quality inspection recording with photographs is specified in the contract document as one of the duty by contractor. Nevertheless in case of Lahalri, the photograph recordings were actually provided by TCP, because the contractor did not have the necessary equipments to prepare the document; camera, computer, printer, etc. In the inspection of measure, TCP always took photographs to exactly understand the measure of inspection scope by the measure tape.



Photograph recording

The procedure for the acceptance of the material and its quality was as follows :

1. The supplier of sand and gravel for aggregate designate by TCP.
2. When the materials are transported to the site, TCP check a certificate of transport of material whether company name, material name, quantity, and date are mentioned.
3. Only the materials that were approved by TCP are brought in the construction site.

In the case of cement, High density pipe (HDPE), steel pipe, valve, and equipment of pump the procedure is as follows,

1. The contractor submitted to TCP the specification of material that has planned to transport to the site. In case it required designation of the ISI code, TCP checked it.
2. It was approved and confirmed by TCP whether the details of submitted document correspond to the contract agreement.

3. TCP finally checked by visual and measure, whether the material that was brought to the site is same with specification.
4. If the martial did not fulfill the condition, TCP refused to it.

At the time of pouring of concrete, the mixing proportion of gravel, sand, water, and cement concrete, based on the advance concrete strength test results, was converted to a container (volume ratio) per unit volume from a weight ratio. The specified mix proportion was checked by supervisor who was employed by TCP at the site.

The running measurement, result of which would be the evidence document at the time of payment, was carried out jointly by TCP and the contractor. The contractor informed to TCP in advance whenever such kind of measurement is to be carried out. After running measurement, the measurement was recorded in the measurement book with signature of both the participating parties (TCP and the Contractor). Based upon running measurement record the progress payment was released by TCP to the contractor.


Running measurement

The shape before excavation should be confirmed by both the owner and contractor, because the quantity of excavation might be contrary between both. The shape after excavation should be confirmed by the running measurement. Timely payments can also be released in accordance eliminating discrepancy between the owner and contractor.

Things described above, things are taken for granted in Japan; they may not be common in Himachal. There is nothing new in it and this was introduced one by one during the trainings to the core extension officers.

Processes of the consensus building with farmers was carried out four times by the TCP around the same time as the design work during the period from August 2011 to September 2011. The various advantages/benefits and disadvantages of the upcoming irrigation facilities construction were explained in detail to the beneficiary farmers.


Consensus building

Beneficial things explained are as follows;

- Planed crop can be cultivated, and
- Irrigation water can be use during dry season.

Disadvantageous things are;

- a part of cultivable land needs to be excavated during construction period,
- fund needs to be reserved for operation and maintenance.

After making the layout of irrigation facilities planning, was made TCP walked to discuss and explain with the land owners and the representative of the organization that

was established by the beneficiaries (hereafter referred to as "KVA") in the site. If the facilities location was objected by farmers, it was reset out and was decided the final locations. After getting approval from the KVA, the TCP collected the "No objection certificate (NOC)" with signatures of concerned farmers stating that they have no objection regarding the construction work in their land.

Before starting construction and after harvesting maize, was harvested location of the pipeline was shown with white line to create clearer image in the farmers of the actual works on the ground. And we explained to KVA they could not cultivate wheat the following season, because inside of the white line was to be excavated for construction. To the opposing farmers, it was explained and promised that their issues will be resolved soon with active collaboration with KVA and TCP. Despite those explanations, complaints and resistance from farmers amounted to 88 times and the construction work had to be stopped for a period of 19 days. There were complaints and opposition against route changing of the location of facilities, the route of pipeline and regarding the activities at the construction site. For example, some farmer said "A donkey/mule for transporting material cannot walk in cultivated land!" "Excavated soil should not be thrown on the wheat!" "Trees cannot be cut without approval of owners." These kinds of objection and conflicts were resolved through discussions between the concerned farmers and joint team of TCP and the KVA members. If some issue was not solved by discussion, then an amendment was proposed.


White line for pipeline


Discussion in the site

The toughest negotiation with farmers was the one with a land owner of the intake. From the starting of the construction, she came to the construction site to stop the work. Although she had signed on the NOC, she made disturbance to stop construction work. 35 complaints out of 88 were from her and her husband. It had often ended inconclusive in spite of repeated discussions. TCP and KVA had discussed perseveringly with them several times. TCP presented possible modification of route of canal to them and agreed to resume the construction. Even though they once agreed, their requests escalated after agreement. Sometime they had threatened the laborers in the site and started out hindrance of construction progress. Their requests were as follows;

1. Construction of retaining wall to prevent landslides
2. Leveling of her field
3. Compensating for the trees cut during the construction work
4. Free usage of irrigation water
5. Construction of tank in their farm/field


Discussion in the site

Moreover, the lady filed a lawsuit with the court to stop the construction work. TCP consulted Deputy Director of Agriculture (hereafter referred to as "DDA") and Project Management Unit (hereafter referred to as "PMU") and explained all the details of the situation. After that the negotiation was organized between the TCP, KVA, DDA, PMU, and her family. TCP offered her the substitution plan, of constructing a retaining wall in the slope of her farmland, on condition of withdrawing the court case. However, it could not be reconciled, and the court case could not yet be withdrawn. In the judgment of the first round, Stay Order (instruction of ceasing contraction) was not sentenced. Reason was that there was no justification of her demand at the timing the construction is almost finishing as the plaintiffs had signed the document to agree with the construction work (NOC). After this judgment the plaintiff appeared at the site, wreaked havoc in the site, and threatened the working laborers. TCP, prioritizing lives and safety of the laborers first of all, stopped site works right on the day. TCP thus organized a meeting with KVA, submitted a notice of the damage in the work site. On the following day, KVA, TCP, opposing farmers, and police discussed regarding construction work in the field. Opposing farmers were warned by police to refrain from the disturbance. Irrigation facilities were completed and operation has started, nevertheless the court case still continues as at end May, 2015.


Discussion in UNA

Likewise, there are also many oppositions or objections of farmers at ODA loan project scheme. In one such case of UNA BPMU, the block director and senior engineer visited the site, and listened the complaint from farmers for three hours, presented the modification plan to them. An agreement has come from farmers. After the visit, the BPM said that we did not explain enough to the farmers at survey time, and they were not interested in detail plan at all either. And the objection come out when the construction started. Is it because of the insufficient explanation at planning time? Or lack of interests of farmers in detail irrigation system? This issue was solved by changing of outlet tank location. The attitude of visiting and sincerely listening to the farmers is a clue of resolution.

4.3 Lessons Learned in Water Management and O&M

(1) Water Distribution

In general, there are two types of water distribution systems. One is the farmer's request based system, and the other is pre-planned rotation based system. The merits and demerits of the two systems are described in the following Tables, and the water distribution system suitable for each project site needs to be decided in consideration of the characteristics of the system.

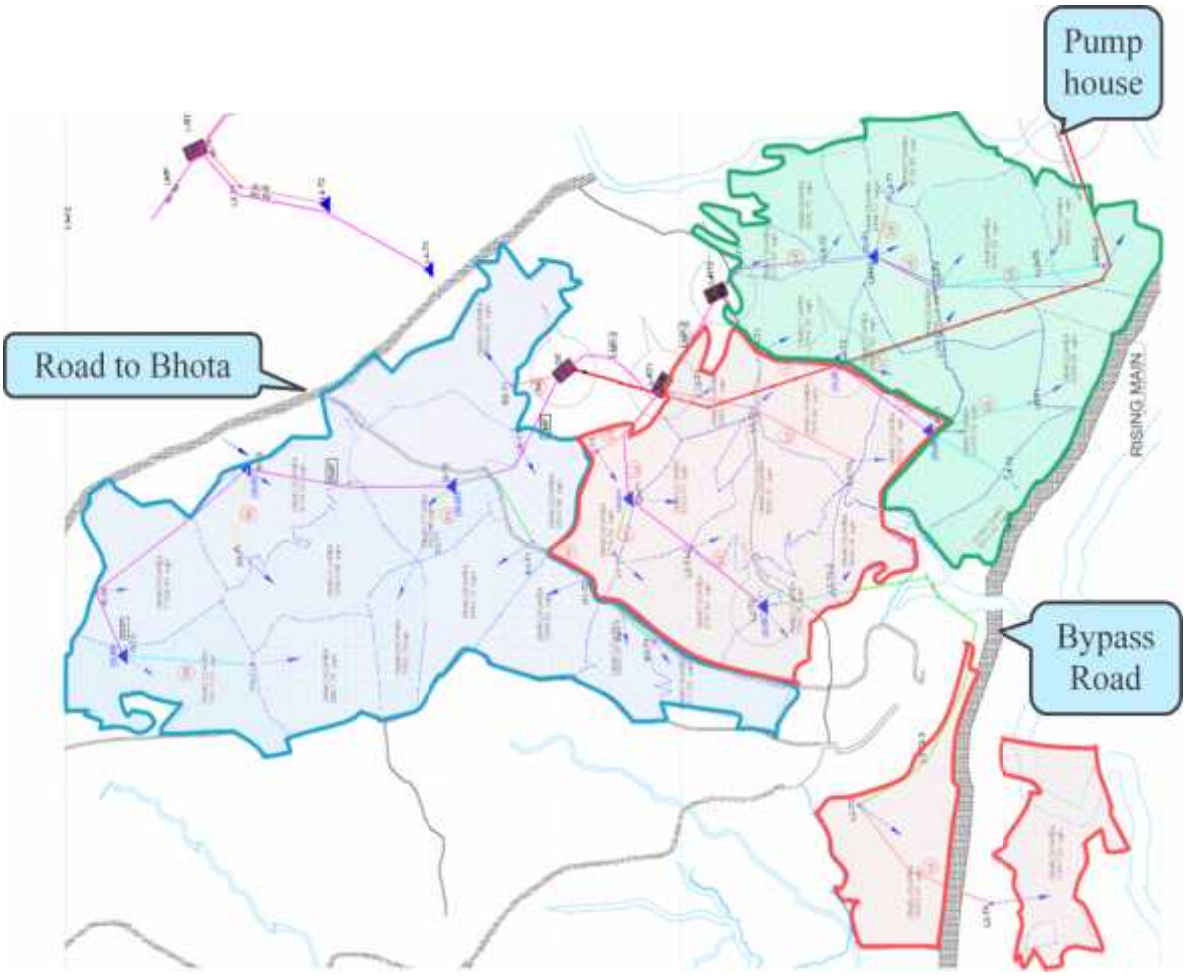
Table 4.2 Farmer's Request Based System

Farmer's Request Based system: Flexible & independent		
Method	**Merits**	**Demerits**
Farmers apply their requests to the Pump Operator (PO) before the irrigation. The PO notes the irrigation record. If many farmers apply their requests at the same time, the PO decides their turns based on first-come first-served basis.	1) This method is very practical, because the farmers can decide their irrigation frequency considering their budget. 2) As per the Water Management survey of TCP team, this method is adopted in most of the study sites of lift irrigation.	1) If all the members request irrigation in the same day, it is difficult to coordinate many requests at the same time. 2) In case of farmers who depend only on rainfall, they don't have enough information on how much water they should irrigate. Therefore, if the famers cannot receive good information, they will not apply proper irrigation water to the crop.

Table 4.3 Pre-Planned System

Pre-Planned Rotation Based System (Warabandi): Fixed & controlled/regulatory		
Method	**Merits**	**Demerits**
In this system, the farmers can apply irrigation water based on the weekly irrigation schedule of the system. Each farmer has a specific time for irrigation depending on the cultivable area. This method can be used by considering not only the area, but also the crop.	**1)** Equitable water distribution can be realized in this method, even if the number of farmers using irrigation water is large, because WUA fixes irrigation schedule before each season.	**1)** If there are many part-time farmers in a project site, it will be difficult to follow the schedule without hiring labor or getting the cooperation of their family members. **2)** This method needs a strong organizational power to implement, because all the farmers need to obey the fixed irrigation schedule.

The project site is divided into 3 blocks in Lahalri as shown in the following Figure.



Outlet in Blue block

Outlet in Red block

Outlet in Green block

Note : Block color can be identified by the color of the outline

Fig. 4.1 Water Distribution Blocks in Lahalri Pilot Area

Each block can irrigate for 2 days in a week as shown in the following Table. And inside each block, the farmer can irrigate based on his/her request. In this way of combining Block-Rotation type and Request-Based type is followed in Lahalri.

Table 4.4 Rotation Schedule in the Pilot Site

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Blue Block (9.8ha)						○	○
Red Block (8.6ha)		○	○				
Green Block (8.2ha)				○	○		

The Positioning of the system in the pilot area is shown in the following Figure. And, it is easier to change the water distribution system from mixed system to request-based system or pre-planned rotation based system. If the number of irrigation users is less, it is rational to follow the simpler request-based system. On the other hand, if the number of irrigation users is high, it is better to follow pre-planned rotation based system.

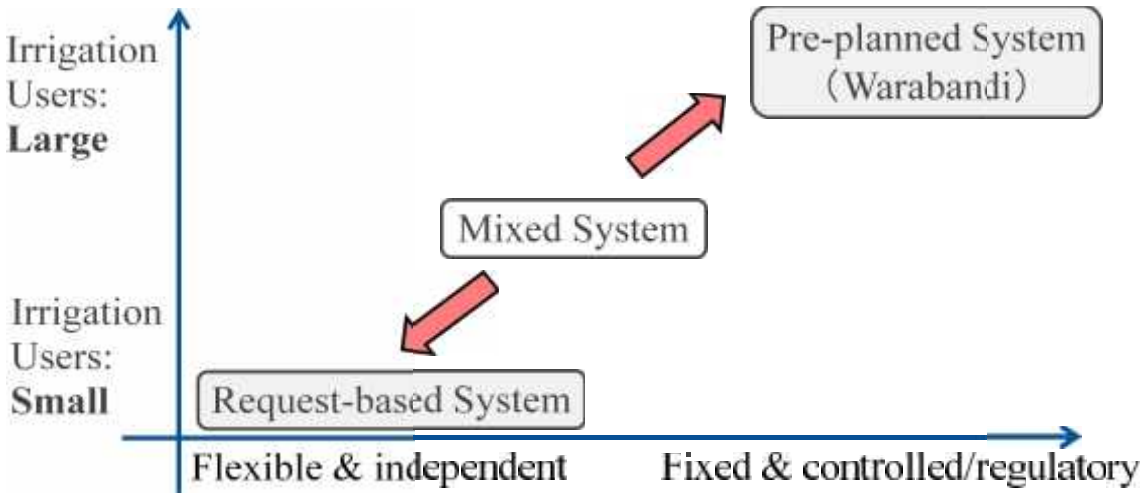


Fig. 4.2 Positioning of the Water Distribution System in the Pilot Area

Based on the experience in the pilot site, the following lessons learned on water distribution can be adopted for the ODA loan or other projects.

- ✓ Extension officer (/Community Motivator) should discuss with WUA about the water distribution system considering the merits and demerits of both simple request-based type and pre-planned rotation based type.
- ✓ If a high number of farmers are interested to use irrigation water in a project site, it becomes difficult to adopt a simple request-based type of water distribution.
- ✓ If there are many part-time farmers in a project site, it will be difficult to adopt pre-planned rotation based type of water distribution.

(2) Operation of Irrigation Facilities

When a farmer is applying irrigation water based on the rule, if another farmer applies irrigation water from another outlet freely, WUA needs to prevent such an illegal use of water. If illegal use of water occurs frequently, the trust towards WUA will decrease, and finally nobody may be interested to pay water tariff, which shall lead to the failure of the system.

A post of Water Distribution Coordinator (WDC) was newly created apart from Pump Operator (PO) for coordination of water distribution activities in the pilot area. The WDC notes the irrigation request from farmers and operates the distribution tank & regulation tanks to distribute water properly by collaborating with the PO. Through the newly created post of WDC, the work load of the PO was reduced and proper water distribution has been realized. Moreover, water tariff is paid with irrigation request in advance. Through the prepaid system of water tariff collection, water tariff have certainly been collected.

All the sluice wheels or keys of the project are managed by the WDC. When a farmer submits a request for irrigation water along with the advance payment, he can get the sluice wheel or the key of the Butterfly valve for the particular outlet. After the irrigation, he needs to close (/lock) the valve and return the wheel or the key to the WDC. Through the lock system, any illegal use of water is prevented.

Fig. 4.3 Lock System for Valves in the Pilot Area

Based in the experiences in the pilot site, the following lessons learned in the operation of irrigation facilities can be adopted for the ODA loan projects.

- ✓ Reliable and active person(s) should be appointed for the operation of the facilities.
- ✓ Advance payment system of water tariff should be adopted, if possible.
- ✓ Necessary measures should be taken to prevent illegal use of water.

(3) Maintenance of Irrigation Facilities

If the facilities are not maintained properly, the repair costs of the facilities will increase. Moreover, if the troubles of facilities occur one after another, the farmer's interest on irrigation will be reduced and eventually the irrigation facilities will not be utilized.

WUA in the pilot area needs to implement the maintenance works periodically. The basic timing of periodical maintenance works is shown in the following table. Through the periodical maintenance, sustainability of irrigation facilities is strengthened.

Table 4.5 Periodical Maintenance

Item	Person responsible	Timing of maintenance
Inspection for pumping facilities	Pump operator	Inspection needs to be done in daily pace. Moreover annual inspection can be considered by an external specialist.
Cleaning of water tank and the other facilities	All members of WUA	WUA should clean the water tanks before every season. Besides, WUA needs to clean the water tanks additionally depending on the condition.
Repair of irrigation facilities	MC members of WUA	Damage of irrigation facilities needs to be repaired as soon as possible.

Based on the experience in the pilot site, the following lessons learned in maintenance of irrigation facilities can be applicable for the ODA loan projects.

- ✓ Maintenance and cleaning of the facilities should be done periodically.
- ✓ The extension officer in-charge of the project needs to provide enough information to the WUA on periodical maintenance and cleaning, and periodical monitoring is essential for maintenance work.

(4) Finance of WUA

If financial management is not conducted properly, WUA will not be able to repair their facilities by their own budget. As a result, the irrigation facilities may be defunct. Therefore, it is very important that WUA would manage their finance properly and increase their saving steadily.

In Lahalri pilot site, all the incomings and outgoings are recorded in the cashbook with receipt by the treasurer. And Audit Committee, which is independently created in-house, performs an audit of the Cashbook and issues a certificate once in a year. Based on the experience in the pilot site, the following lessons learned in Finance of WUA can be applicable for the ODA loan projects.

- ✓ All the incomings and outgoings need to be recorded in the cashbook with receipt.
- ✓ Internal audit should be performed within WUA.

(5) Meeting of WUA

Management of WUA is conducted through their meetings. In the meeting, important activities (operation status, maintenance status and financial status) need to be reported by each responsible person to the other members based on the recorded facts. And problem in each activity and its remedial measure need to be discussed for taking necessary action. This is an application of PDCA cycle.

In Lahalri pilot site, Management Committee holds MC meeting every 2 months to discuss the management and operation of WUA. And General Body meeting is held twice in a year and approves important matters which are pre-decided by Management Committee. Based on the experience in the pilot site, the following lessons learned in Management of WUA can be applicable for the ODA loan projects.

- ✓ Management Committee should be held with at least every 2 months.
- ✓ General Body meeting needs to be held twice in a year (before each cropping season).
- ✓ Important matter should be shared and approved in GB meeting.

(6) Summary of Lessons Learned in the Field of Water Management and O&M

Based on the experience in the pilot site, the following lessons learned can be applicable for the ODA loan projects as summarized in Table 4.5. To promote crop diversification, it is important to follow these lessons learned in the field of Water Management and O&M.

Table 4.6 Summary of Lessons Learned in the Field of Water Management and O&M

Activities /Subject	Lessons Learned from the Pilot Project
Water Distribution	✓ Extension officer should discuss with WUA about water distribution system considering merits and demerits of both simple request-based type and pre-planned rotation based type. ✓ If many farmers are interested to use irrigation water in a project site, it becomes difficult to adopt a simple request-based type of water distribution. ✓ If there are many part-time farmers in a project site, it will be difficult to adopt pre-planned rotation based type of water distribution.
Operation of Irrigation Facilities	✓ Reliable and active person should be appointed for the operation of the facilities. ✓ Advance payment system of water tariff should be adopted, if possible. ✓ Necessary measures should be taken to prevent illegal use of water.
Maintenance of Irrigation Facilities	✓ Inspection and cleaning of the irrigation facilities should be done periodically. ✓ The extension officer in-charge of the project needs to provide enough information to the WUA on periodical inspection and cleaning, and periodical monitoring is essential for maintenance work.
Finance of WUA	✓ All the incomings and outgoings need to be recorded in the cashbook with receipt. ✓ Internal audit should be performed within WUA at least once in a year.
Meeting of WUA	✓ Management Committee meeting should be held at least every 2 months. ✓ General Body meeting needs to be held twice in a year (before each cropping season). ✓ Important matter should be shared and approved in GB meeting.

Activities /Subject	Lessons Learned from the Pilot Project
The others	✓ Practical investigation of water resource is necessary for sustainability of WUA. The actual condition of water level or quantity needs to be grasped through interviewing the famers, especially in the dry season. ✓ The proportion of full-time farmers should be checked for sustainability of WUA. ✓ If there is any problem in the above mentioned two conditions, serious consideration is necessary including changing of the project site. ✓ The extension officer should repeatedly make the farmers understand that the farmers are the main actors of the irrigation project, and the irrigation facilities are the properties of the farmers.

(7) Water Tariff and O&M Cost (considering the case of Lahalri Pilot Area)

For the sustainable O&M of sub-projects constructed under JICA-ODA loan project and similar other schemes of the DoA, it is very important to estimate the user charges (water tariff) of each scheme by taking into consideration of the electricity charges, fee for pump operation / coordinator, repair and maintenance cost of machinery and infrastructure created, etc. The combination of components of water tariff would be different depending on type of irrigation system as shown in the following table.

Table Sample Breakdown of Each Component of Water Tariff by Types of Irrigation System

Components	Breakdown by Types of Irrigation System		
	Lift Irrigation System (LIS)	Flow Irrigation System (FIS)	Tube Well Irrigation System (TWIS)
Maintenance cost	- Repair of pipe - Repair of concrete channel and small structures - Repair of pump equipment	- Repair of concrete channel and small structures - Repair of poly house	- Repair of pipe - Repair of concrete channel and small structures - Repair of pump equipment
Operation cost	- Pump operator - Water distribution coordinator	- Water distribution coordinator	- Pump operator - Water distribution coordinator
Electricity cost	- Operation of pump		- Operation of pump

The actual information on fixing of water tariff adopted by water users group in Lahalri Pilot area has been given as a sample in the Guidelines PART-II (Page 9, Chapter 3, O&M cost/ water tariff, WM-01-01: Guidelines for Water Management by Water Users' Association).

Further, the actual repair cost on pipe lines in Lahalri is shown in Table 9 of the same Chapter. From the table, it is intimated that on an average for undertaking single repair about Rs. 5,000 are approximately calculated, thus if leakage presumed as two time a year (1 time per cropping season) then budget of Rs. 10,000 might be required for each sub-project.

Further, the following table is useful when it comes to estimate water tariff as well as maintenance cost if any. It is proposed that materials and equipment to be required for estimation should be selected from each breakdown in the table. This table was prepared as a sample, based on the experience of TCP in the pilot area.

Table Major Items on Materials as well as Equipment and Water Tariff

Components	Breakdown	Items
Maintenance cost	- Repair of pipe	Labor Pipe Fitter fee (Skilled) tools (include fitter fee) ・Cutting tool ・Sand paper ・Pipe Jointing machine Material ・Adhesive(e.g. m-seal) ・Rubber tube ・Clamp ring ・Sand paper ・Accessory(Reducer, Peace of pipe)
	- Repair of concrete canal and small structure	Labor Masson fee (Skilled) tools (include mason fee) ・Trowel ・Shovel or Scoop (mixing for mortar) ・Chisel & Hammer ・Steel brush Material ・Cement ・Sand ・Adhesive(e.g. m-seal) ・Water proofing solution (e.g.Dr.Fixit)
	- Repair of pump equipment	Labor Pump Technician (Skilled) tools (include Pump Technician fee) ・Wench ・Open spanner ・Ring spanner Material ・Gasket for foot valve ・Rubber coupling joint for driving shaft ・Grease for baring of shaft of pump ・Gland Packing for prevent leakage form pump
Operation cost	- Pump operator	
Operation cost	- Water distribution coordinator	
Electricity cost	- Operation of pump	- Electricity cost to be variable by pump capacity

Furthermore, it is strongly suggested that water user charges (water tariff) as well as O&M cost should be estimated and attached in DPR, based on the sample of TCP as well as actual experience obtained from the existing sub-projects. Consequently extension staff would be able to disseminate them to water users group, in order to decide tariff by themselves. In addition, to make financial position of KVA strong, the practice of monthly contribution by each member should be continued.

4.4 Lessons Learned in Vegetable Farming and Post-harvest

Through activities like training as well as technical support to the farmers in Lahalri pilot area, we experienced some constraints as well as troubles. In order to overcome these problems we took some countermeasures.. It is expected that by sharing of our experiences in the Pilot site, the Users of these Guidelines can overcome similar kind of difficulties they may experience and can further carry out their activities effectively and smoothly.

(1) Fertilizers

It is observed that major crops in Lahalri pilot area are wheat in winter season and maize in summer season for home consumption so far. Cultivation of vegetables is not popular in the area. Hence farmers have used less amount of fertilizer, and also have less knowledge on application of fertilizers. Meanwhile it is also experienced that supply of fertilizer is not consistent with thetiming of demand of farmers hich may be due to current situation of fertilizer industry. Lessons learned on fertilizeruse are summarized in the following table.

Table 4.7 Summary of Lessons Learned on Fertilizer

Subjects	Current Situation	Essential Points to be considered
Application of chemical fertilizers	Balanced doses and timing of application of fertilizer are not known to the farmers	Instruction for effective and balanced use of fertilizer s should be given.
	Availability of fertilizer is not stable. *Refer **Table 4.8***	It is proposed that other chemical fertilizers or organic fertilizer be used.
		Ho w to calculate dosage of other fertilizer should be instructed to the farmers

Source: JICA TCP

Table 4.8 Availability of Fertilizer in Hamirpur District

Type of Fertilizer	Phase 2	Phase 3	Phase 4	Remarks
	Jul. 2012 to Apr.2013	May 2013 to Apr. 2014	May 2014 to	
Urea	○ Rs.270/50kg	○ Rs.270/50kg	Rs.290/50kg	-Less available since 2014
SSP (Single Super-Phosphate)	○ Rs.485/50kg	×	×	-Available up to Kharif 2013 -Not available since Rabi 2013/14
MOP (Muriate of Potash)	○ Rs.600/50kg	×	×	-Available up to Kharif 2013 -Not available since Rabi 2013/14
12:32:16	×	○ Rs.1,030/50kg	○ Rs.1,100/50kg	-Not available during Kharif 2013 -Available since Rabi 2013/14

Note: ○: available, Δ: less available, ×: not available
Source: HIMFED, Hamirpur

(2) Seeds

Seeds are available in government shops or private shops. It is, however, not always true that seed is valid, and its quality is reliable. It is suggested to purchase seeds after careful confirmation on availability, validity, and suitability of that variety to the specific area y. Lessons learned on seeds are summarized in the following table.

Table 4.9 Summary of Lessons Learned on Seeds

Subjects	Current Situation	Essential Points to be considered
Promising varieties	Some varieties are not available at government shops or University. *Refer **Table 4-10**.*	It is proposed to undertake early confirmation and arrange seeds of promising varities from reliable source.
Purchase of seeds	Seeds of some crops were not always available. *Refer **Table 4-10**.*	Seeds are not always available. So it is proposed to undertake early confirmation and arrangement of seeds to be required from government shops, University, or private shops.
Validity of seeds	Expired seeds are available in private shops.	It is proposed to buy seeds, checking the validity on the label.
	There are some packages without information on validity.	
Package	In some packages, instruction is written in some languages except English.	It is proposed to buy seeds, checking the validity on the label.

Source: JICA TCP

Performance of varieties, which were used by farmers in the Lahalri pilot area, are shown in Table 4.11.

(3) Agro-chemicals (Insecticides / Fungicides)

As mentioned before, cultivation of vegetables is not popular in the area. Hence farmers have less knowledge on application of agro-chemicals. Lessons learned on Agro chemicals are summarized in the following table.

Table 4.10 Summary of Lessons Learned on Agro-chemicals (Insecticides / Fungicides)

Subjects	Current Situation	Essential Points to be considered
Diagnosis of insect pests and diseases	Farmers have less knowledge on insects and diseases in vegetable cultivation.	- Proper instruction should be provided through pictures/photos , management tips and guidelines, etc.
Selection and application of agro-chemicals	Farmers are using agro chemicals on the advice of Traders which are very toxic and have long residual effect.	- Block office should keep photos, guidelines, etc. for farmers.
	Farmers have lack of experience on application of agro-chemicals.	- Dilution as well as dosage of agro-chemicals for their field should be taken from extension officers.
Dissemination of technology	Farmers used too much doses of pesticides	- Proper guidance on how to use these agro-chemicals has been given to farmers. - Safety provision should be on first priority.
	Farmers have no knowledge of botanical insecticides & fungicides *Refer Table 4-13.*	- Information disseminated among farmers to use different botanical extract to control pests and diseases. - Suggestions on proper IPM techniques have been expand among farmers.

Source: JICA TCP

Table 4.11 List of Purchased Seeds (1/3)

No.	Crop/Verities	OP / F1	Proposed by H.P.	University	Sales Shop of DoA		Private Shop								KVK
					Shimla	Hamirpur	Nadaun	Palampur	Chandi-garh	Sunder-nagar	Shimla	Una	Sirmaur	Delhi	
1	**Tomato**														
	Avatar	F1								✔					
2	**Cherry Tomato**														
	7730	F1				✔									
	Solan Red Round	OP		✔S											
2	**Brinjal**														
	Sandhya (round)	F1				✔									
	Chaya (long)	F1					✔								
3	**Capsicum**														
	Mahabharat	F1				✔									
	Natasha	F1								✔					
4	**Cucumber (open field)**														
	Noori Improved	F1				✔									
	NS-404	F1					✔								
4	**Cucumber (poly house)**														
	Isatis & Kian	F1					✔			✔					
5	**French Bean**														
	Falguni	OP					✔								
6	**Peas**														
	Main Varieties														
	Maharajal	OP									✔				
	Azad P-1	OP		✔P											
7	**Cauliflower**														
	Early Varieties														
	Megha	F1					✔								
	Late Varieties														
	Hybrid-626	F1					✔								
8	**Cabbage**														
	S-92	F1					✔								
9	**Turnip**														
	Purple Top White Globe	OP					✔								
10	**Radish**														
	Japanese White	OP		✔P											
	Maharani	OP					✔								
	White Ivory	F1					✔								
11	**Onion**														
	N-53	OP					✔								
12	**Garlic**														
	GHC-1	OP		✔P											

Table 4.11 List of Purchased Seeds (2/3)

No.	Crop/Verities	OP / F1	Proposed by H.P.	University	Sales Shop of DoA		Private Shop								KVK
					Shimla	Hamirpur	Nadaun	Palampur	Chandi-garh	Sunder-nagar	Shimla	Una	Sirmaur	Delhi	
13	**Spinach**														
	Harit Shabha	OP					✔								
14	**Chinese Sarson**														
	Palampur green	OP		✔P											
15	**Fenugreek**														
	Kasuri	OP				✔									
16	**Coriander**														
	Sughanda	OP				✔									
	Royal Bliss	OP					✔								
	Romases	OP					✔								
17	**Swiss Chard**														
	Fordhook	OP							✔						
18	**Lettuce**														
	Balmoral	F1												✔	
19	**Broccoli**														
	Palam Samridhi	OP		✔P											
20	**Red Cabbage**														
	Red Winner	F1						✔							
21	**Chick pea**														
	HC 1	OP													✔B
22	**Faba Bean**														
	Local	OP						✔							
23	**Potato**														
	Kufri Jyoti	OP			✔	✔									
	Kufri Pukhraj	OP										✔			
24	**Turmeric**														
	Local*	OP													
25	**Ginger**														
	Himgiri	OP											✔		
26	**Mustard**														
	Local *	OP													
27	**Fennel**														
	Local	OP		✔U											
28	**Long yard bean**														
	Local*	OP													
	Andy	OP					✔								

Table 4.11 List of Purchased Seeds (3/3)

No.	Crop/Verities	OP / F1	Proposed by H.P.	University	Sales Shop of DoA		Private Shop								KVK
					Shimla	Hamirpur	Nadaun	Palampur	Chandi-garh	Sunder-nagar	Shimla	Una	Sirmaur	Delhi	
29	**Okra**														
	Tulsi	F1				✔									
	Palam Komal	OP													✔H
30	**Bottle gourd**														
	Sharda & Anmol	F1					✔								
31	**Bitter gourd**														
	Pali	F1					✔								
32	**Snake gourd**														
	Polo	F1					✔								
33	**Sponge gourd**														
	Local*	OP		✔U											
34	**Squash**														
	Kathrina	F1					✔								
35	**Pumpkin**														
	Local* (Assam)	OP													
36	**Elephant foot yam**														
	NDA-9	OP		✔U											
37	**Soya bean**														
	Harit Soya	OP		✔P											
38	**Savoy Cabbage**	F1							✔						
39	**Snow Pea**	F1							✔						
40	**Colored Cauliflower**	F1							✔						
41	**Brussels Sprout**	F1							✔						
42	**Romanesco**	F1							✔						

Notes:

(1 Local*: purchased by farmers themselves from other farmers, or produced by themselves

(2) OP: Open pollinated, F1: Hybrid

(3) University: P: CSKHPKV (Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishya Vidyalaya), Palampur, HP

S: Dr. YS Parmar University of Horticulture and Forestry, Nauni-Solan, HP

U: Narendra Dev University of Agriculture and Technology, Faizabad, UP

(4) KVK: B: KVK Berthin in Bilaspur District, H:KVK Bara in Hamirpour District

(5) Contact number:

University, Palampur:	ATIC, 01894-230395	Private shop in	KD Seed Store, 01907-262408
University Solan:	Directorate of Extension, 01792-252706	Private shop in Shimla:	DSV Theog, 9816507005
University U.P.	Directorate of Extension, +91-5270-262161	Private shop in Una	Agriculture General Store, 9418338538
Sales shop of DoA,	DDA Shimla, 0177-2831558	Private shop in Sirmaur	Saton Spice Growers Association, 9816213090
Sales shop of DoA,	DDA Hamirpur, SMS office, 01972-221535	Private shop in Delhi	Swami Seed Agency, 098117 25444
Private shop in	Saini Seed Store, 9418141603	KVK Berthin in Bilaspur	Office, 01978-266046
Private shop in	Vasudeva Seed Store, 9418079263	KVK Bara in Hamirpur	Office, 01972-238130
Private shop in	Durga Seed Store, 0172-2790776		

Table 4.12 Performance of Major Vegetable Varieties adopted by Farmers in the Lahalri Pilot Area

No.	Crop/Varieties	Recommended by HP*1	Findings in Lahalri Pilot Area
1.	**Tomato**		
	Avatar	DoA	- High yielding variety -Good for polyhouse as well as open conditions
2.	**Cherry Tomato**		
	Solan Red Round	S	- Good in yield and high TSS
3	**Brinjal**		
	Sandhya (round)	DoA	- Recommended by DoA - Severe attack of fruit and shoot borer so less yield
	Chaya (long)	No	- only green coloured variety available - Less attack of fruit and shoot borer
4.	**Capsicum**		
	Mahabharat	P	- Good for green fruit harvest
	Natasha	P	- Good for green as well as red coloured fruit harvest
5.	**Cucumber (open field)**		
	Noori Improved	DoA	- We found very less fruit set
	NS-404	No	Good fruit setting, appearance similar to local cucumber and higher yields
	Nazia	No	-Good fruit setting higher yield variety
6.	**Cucumber (poly house)**		
	Isatis & Kian	P	- Seedless varieties with high yield - As per the consumers response the taste of Isatis is more good as compare to Kian
7.	**Peas**		
	Maharajal	No	- Good response in hilly areas of H.P - Higher yields
	Azad P-1	DoA	- Higher yields
8.	**Cauliflower**		
	Early Varieties		
	Megha	No	- Higher yields with white curds
	Late Varieties		
	Hybrid-626	No	- Higher yields with big sized white curds
9.	**Radish**		
	Japanese White	P	-Higher yields with big sized roots
	Maharani	No	-Found good roots in summer without bolting
	White Ivory	No	- for winter season - Found good roots with very soft leaves
10.	**Onion**		
	N-53	P	-Good nursery for sale and onions production
11.	**Broccoli**		
	Palam Samridhi	P	Good yield but not very big heads
12.	**Potato**		
	Kufri Jyoti	DoA	Higher yields
	Kufri Pukhraj	DoA	Higher yields
13.	**Ginger**		
	Himgiri	P	Good production with characters like high pungency
14.	**Okra**		
	Tulsi	P	High yielding and yellow vein mosaic resistant variety
	Palam Komal	P	New released variety supposed to be high yielding and disease resistant

Note) *1 Recommended by H.P. Government:
DoA: recommended by DoA
P: recommended by Plamapur University
S: recommended by Solan University
NO: not recommended, but farmers prefer this variety.

Table 4.13 Pesticides and Fungicides applied in the Lahalri Pilot Area

(a) Pesticides

No.	Common Name (*Trade Name*)	Major Insects/Diseases	Major Crops	a / na*1
1	Malathion (*Milthion, Massthion*)	Fruit fly, Hadda beetle, Potato tuber moth, red pumpkin beetle	Potato, brinjal, Cucurbits	a
2	Propargite (*Simba*)	Mites	Tomato, cucumber, capsicum	na
3	Emamectin benzoate (*Missile*)	Shoot and fruit borer, tobacco caterpillar	Brinjal, Cole crops	na
4	Chlorantranilprole (*Coragen*)	Shoot and fruit borer	Brinjal, okra	na
5	Flubendamide (*Liako, Fame*)	*Helicoverpa armigera*, Shoot and fruit borer	Tomato, brinjal	na
6	Indoxacarb +Novaluron (*Plethora*)	*Helicoverpa armigera,* Pea pod borer	Tomato, Pea	na
7	Imidacloprid (*Confidor, Confidence*)	Aphid, whitefly, thrips, jassids	Tomato, capsicum, okra	a
8	Cypermethrin (*Super Fighter, Challenger*)	Fruit and shoot borer, epilachna beetle, diamond back moth	Brinjal, cabbage	a
9	Dimethoate (*Rogar*)	Thrips, whitefly	Tomato, capsicum	a
10	Acetamiprid (*Pride*)	Aphid, thrips	Tomato, capsicum	na
11	Dichlorvos (*Nuvan*)	Red pumpkin beetle	Cucurbits	a
12	*Trichoderma* spp. (*Niprot*)	Nematodes, soil borne diseases	All crops	na
13	Carbofuran (*Furadon*)	Nematodes	Tomato, cucumber	a
14	Chlorpyriphos (*Lethal*)	Cutworm, white grub, termites	Potato	a
15	Deltamethrin (*Decis*)	Fruit and shoot borer, fruit borer	Brinjal, tomato, okra	a
16	Fenpyroximate (*Dynamite plus*)	Yellow mite	Capsicum	na

(b) Fungicides

No.	Common Name (*Trade Name*)	Major Insects/Diseases	Major Crops	a / na*1
1	Chlorothalonil (*Kavach*)	Phytophthora blight, downy mildew, Early and late blight	Capsicum, tomato, potato cucurbits	na
2	Carbendazim (*Benmain*)	Powdery mildew, leaf spot, fruit rot	Cucumber, tomato, capsicum	a
3	Metalaxyl +Mancozeb (*Syscon, Ridomil*)	Late blight	Tomato, potato	a
4	Copper oxychloride (*Maincop*)	Early and late blight	Tomato, potato	a
5	Mancozeb (*Dithane M-45*)	Early and late blight, damping off	Tomato, potato	a
6	Propineb (Antracol)	Early and late blight, buck eye rot	Tomato, potato	na
7	Captan (*Captax*)	Damping off, Early and late blight	Tomato, cucumber, capsicum, brinjal, Potato, cole crops	a
8	Difnoconazole (*Score*)	Early blight, powdery mildew, fruit rot	Tomato, capsicum, potato, cucurbits	na
9	Hexaconazole (*Malnex, Contaf)*	Powdery mildew, fruit rot	Tomato, capsicum, cucurbits, pea	na

*Note: *1: a: Stock of agro-chemicals was available, na: Stock of agro-chemicals was not available, when needed.*
Source: JICA TCP

(4) Post-harvest Techniques

In the Lahalri pilot area, farmers mainly cultivated staple food crops such as wheat, maize, and some favorable crops such as fodder crops, paddy, etc for home consumption. Therefore, they have no knowledge about post-harvest techniques as well as marketing skills for vegetables. Lessons on post-harvest, which were learned through our technical support in the Lahalri pilot area, are summarized in the following table.

Table 4.14 Summary of Lessons Learned on Post-harvest Techniques

Subjects	Current Situation	Essential Points to be considered
Selection of produce	Farmers have lack of information on selection of produce.	Establishment of selection standards in the field level
	Insufficient information on selection	Dissemination of selection techniques
Grading of produce	Grading is not followed as the farmers are not aware about the importance of grading techniques	Familiarization of Grading and f quality standard for good profit,
Packaging of produces	Packaging is not followed and farmers don't realize importance of packaging techniques	Promotion of packaging in the field level. Use of old news paper and used corrugated cardboard boxes.

Source: JICA TCP

(5) Farm Management

With the start of cultivation , the farmers of Lahalri are facing various problems, in daily activities. Lessons on farm management, which were learned through our technical support in the Lahalri pilot area, are summarized in the following table.

Table 4.15 Summary of Lessons Learned on Farm Management

Subjects	Current Situation	Essential Points to be considered
Crop damage	Damage of crops by wild animals like monkeys, squirrels, rats and wild boars.	Cultivation of crops such as colocasia, ginger, garlic, okra, elephant foot yam, etc. should be popularized.
		Protected cultivation with poly houses, tunnel net, strings, special crops should be introduced.
Manpower for agricultural activities	Shortage of manpower for agricultural activities	Improvement of farming technology and productivity Introduction of small tilling machinery.
		Promotion of employment of contract farmers
	Group farming is not popular.	Benefit of group farming should be disseminated.
Conflict management among villagers	Jealousy towards successful farmers is generated among farmers.	Equal opportunity to get support from project and outside institutions for everyone
	Spread of wrong information or rumors about successful farmers or their products.	Discourage rumors r and ensure correct information sharing in official meetings.
Labour and land owner's relationship	Land owners are not courteous to the Contract labour in providing the basic amenities for their stay.	Preparation of guideline for contract farming for sustainable cultivation of crops. farming

Source: JICA TCP

4.5 Lessons Learned in SHG Development

(1) Selection of SHG activities

Selection of activities is one of the important essences of support, which can largely influence on the success of the SHG. No need to say, it should be the group members who decide the activities through discussion among members based on their interest and objectives. However, project normally have limitation in their capacity and policy on types of activities to support, thus the project may not be able to support what the SHG selected. In crop diversification project, focus of the support is agriculture related activities that can contribute to crop diversification either directly or indirectly. The project can provide options of potential activities that can be supported based on the situation and interest of the members. Through the experience of TCP, the following activities were evaluated effective with specific purposes and under certain situations.

- Nursery raising:

Nursery raising is a profitable activity for the SHG that does not have irrigated land suitable and enough for vegetable cultivation. This is one of the good activities that involve disadvantaged farmers, not limiting the benefit of crop diversification to relatively advantaged farmers. Although it was not adopted by the SHG in the pilot area, activity to supply agriculture related materials are also potential activity for those who do not have enough land. Seedling raising and supply as an activity of SHG is effective for crop diversification where there are many small scale farmers. Needs of seedlings are low in the area where a majority is larger scale farmers as those large scale farmers tend to prepare seedling by themselves.

- Food processing:

The primary purpose of the food processing in crop diversification project is for maximum use of vegetables from the farms by processing those out of standard, when the price is low, or excess produces. However, demands of the vegetable processed food were low in the local market as most of families prepare those at home. As a result, the SHG came to focused more on the profitable products regardless the use of vegetable or not. Although this was not exactly what was intended through food processing activities from crop diversification point of view, this actually resulted in sustainable and self-sufficient operation of the SHG activity. The SHG became able to manage their activities by themselves with their profit. Food processing, even not utilizing vegetable, can contribute to the objective of the project. Capacity of women, who are important actors in crop diversification can be developed through processing activities in a group. They can be equipped with skills and experiences of group working management, record keepings, production management, marketing etc, which is commonly important in crop diversification activities. Sustainable

group activities can result in development of other activities that can contribute to crop diversification. Therefore, it is important to start with the activities with their interest instead of sticking to the intention of the project.

(2) Difficulties and failure at the beginning of the activities

SHG members tend to have high expectation when they start their activities. However, what actually happen in many cases are lots of difficulties and much less production than they expected. This kind of situation is fairly likely with immature SHGs. Therefore, it is necessary to predict those loss and failure and to be ready to take counteraction against the unfavourable situation.

In the nursery cultivation activity of an SHG, germination of seeds was much less than expected. This was mainly due to excess water to the seedlings by watering from water hose, which washed away the seeds. They also faced problem of termite attacks, rodents attacks and insects damage on the germinated seedlings. In group farming activities, they also faced monkey attacks, disease of the vegetables, which resulted in less growth and productivity. In food processing activities, their dehydrated processed products did not get dried up properly due to unpreferable weather conditions and members were not happy with the quality of their products. Not only in their production, but they also faced lots of difficulties in marketing of their products. Sales prices were less than they expected, which was partially due to lower quality of their products. Demands were less than they thought and they ended up to sell with even lower price to avoid waste.

Although these failures discourage SHGs losing their confidence on their activities and expectation for profit, it is also taken as important process for them to develop their activity as well as their confidences. A failure is not a loss, but is a great opportunity for them to learn from it. What the project, as a supporting agency, needs to do is not to avoid all those failures, but to provide options of counteractions against the difficulties and to encourage them to overcome their problem, which can result in their confidence and learning.

After a whole process of their production and marketing with several problems, the SHGs improved their production activities in the second round. By learning from the first trial, an SHG reviewed their choice of products and shifted to more suitable products. Others judged their production schedule more carefully considering marketing demand and environmental conditions. They revealed that experience is the strongest learning to improve their activities. However, it should be notified that failures can also discourage SHG members that may result in ceasing of activities or even dysfunction of the group. Therefore, it is important to keep encouraging and support the SHG to find their solution when they face problems.

(3) Introduction of new technology and decision of the group

Although projects have an advantage to introduce new technologies to improve current situations, it is often difficult for the people to adopt new things that they have not experienced before. The following cases explain how difficult it is to introduce things that is new to people and how a project can overcome it.

Some SHG members raised doubts over the nursery sowing technique introduced by the project, such as preparation of bed and space between lines of seedlings. Regarding the space, the SHG members wanted to sow the seedlings densely to fill the empty spaces in case the germination percentage of the seedlings in not good. The SHG members felt that the TCP was recommending too much gap between the lines of the nursery. Taking consideration of their doubt, the TCP team proposed them to sow nursery seedlings in two different ways separately, with the introduced technology and as per their traditional practice, and thereafter to compare the results of the seedlings by observing grown through each method on the basis of the germination percentage and the healthiness of the seedlings. The SHG members accordingly compared the results and found out that the seedlings grown through the method introduced by the project were much healthier as compared to the seedlings sown through the traditional method. It was also found that the germination percentage of the seedlings sown by keeping proper gap between seeds was much higher than the seedlings sown by traditional method.

It is tough to change people's perceptions about the traditional techniques of agriculture which are still being followed. Therefore, it is important to teach farmers through practical demonstrations rather than forcing them to do only with explanation by words. Furthermore, when the SHG did not have satisfactory results with the practice, of which they had doubt on the introduced techniques and methods, members tends to blame the new technology and consequently the project. For enhancement of capacity of the SHG members, the project encourages the SHG to make their decision while introducing new ideas and technologies. When the SHG members are not sure about the practice, it would be worth letting them to try both of the methods or several different ways for them to learn and find out the best ways for them. This process can enhance capacity of the members by judging the preferable and suitable methods by themselves.

(4) Disparity in participation among group members

Group activities could be ideally attended by all the members equally following their divided roles. However, it is often difficult as the interest level of each member differs. The project often faced the situation of low attendance in meetings and less contribution from certain members even though they express their interests on the activities. At the beginning, the project emphasized the participation of the majority. However, it was realized that participation is highly related with the motivation that could be raised through their practices. Therefore, the project carried on the support on the activities of the SHGs only with active participants. The activities progressed by the initiatives of the active

members. As the activities develop, some members who were reluctant before has slowly joined the activities on the process.

Nevertheless, as the activities generated some profits, another issue was raised due to different level of participation among members. Disparity in participation and contribution in the activities caused unfairness among the members especially between those who have contributed a lot and those not. Some of the active members felt reluctant in sharing the products and earnings with members who had not fully participated in the activity. Unfairness between active members and non active members could cause group conflict. The project team facilitated the members to take a positive decision on it, and in the end it was decided that the members would get shares of the products and profits as per their work and contribution during the activity.

It is practically normal for groups to have active and non- active members. It is more realistic to focus on the active motivated members at the beginning of the group activities instead of expecting all the members to participate fully and equally. It shall be important to generate understanding of the members that it is their activity and they are the ones who will benefit from it. And through development and success of the activities by the active members, other members who have not been active shall gradually join the activities by observing the success of the active members. Therefore, it shall be effective to proceed with active members, even with a small number, instead of negatively suspending activities due to lack of participation of other members. Success of one of the groups will also stimulate motivation of other nearby groups. By coming across the success of nearby group, other group might have competitive mind feeling they can also do something as that group has managed.

Rules and decision made by the group on the fair allocation of the profit was another important solution. Share based on their contribution creates fairness and would also provide flexibility among the members on their participation according to their situation and capability, which shall enable members to participate in the activities in sustainable manner as they can manage their work with some flexibility.

(5) Business mind development (case of seedling production)

As is often seen in SHGs, members have not experienced any business activities but inter loaning. When the original purpose of forming the group was not for small entrepreneurship, it will take time to develop their mind from individual income generation to business operation. Therefore, the SHG will often face problem in marketing their products even after they achieved good production.

The SHG in Lahalri also faced problems in marketing their products. At the beginning, they started selling their seedlings to their villagers as there are enough demands within the village mainly because the supply was still small. As their production grew, they realised that it is difficult to find buyers in the village. This is not only because the amount of supply grew,

but also because the price of the nursery was relatively high compared with the one in market, and due to delay in marketing of nursery resulted in overgrowing of the nursery seedlings. As the members did not have enough marketing experience and recognition of importance of marketing, the group members were reluctant in moving out to sell their products, even though the success of any income generating activity depends upon its marketing and proper planning in this regard. After consultation with the project for the possible marketing opportunities and strategy, the SHG members came up with some options for marketing and explored their possibilities, by lowering the price of nursery seedlings to dispose them at the earliest, showcasing their nursery to every meeting and gathering to introduce their products to the public, taking demand based order from nearby relatives, and selling the nursery seedlings at a roadside local market. Some examples of the learning on the nursery marketing are as follows;

- ✓ The products should be prepared and marketed as per requirement of the customers, e.g. nursery seeds should be sown as per the seasonal requirement of the local area targeting the transplanting timing of the expected buyers.
- ✓ In order to provide more options to the consumer nursery seedlings of different varieties and kinds should be sown.
- ✓ Nursery should be sown over an interval of 3-4 days or even a few weeks as this gives additional time and flexibility during its marketing stages.
- ✓ Prior demand based orders should be taken and fulfilled as and when required.
- ✓ The pricing should be as per the market prices and the quality of seedling should match up with the price.
- ✓ Responsibility and tasks of selling a certain number of seedlings can be assigned to each member.
- ✓ In case of surplus sale of nursery to vendors and other shopkeepers pricing can be reduced if that vendor insists.

It is normal for the small entrepreneurs to face difficulties in marketing their products as they do not have comparative advantage in scale and quality against established big producers or industries. Therefore, it is required to spare enough time and effort for the SHG members to recognize importance of marketing their products in addition to their production and think about their business strategies.

(6) Material support on SHG activities

Initial investment is necessary to some extent for SHGs that cannot afford to take risks. If they fail with new activities at the initial stage, it is highly likely that they lose their confidence and quit their activity. Some SHG may hesitate to start any new activity if they fear the risk of failure. To support the underprivileged to establish their group activities, an opportunity to start is very important. Initial investment and support to sustain activities with

success in early stage can encourage the SHG members, which will later result in sustainability of the group. On the other hand, judgment of initial investment is important not to spoil their ownership. Support such as equipment to start activities should be introduced with sensible conditions and arrangement. For example, the equipment support can be introduced only after observing any initiatives by the group with their own effort or with a little support with the project to confirm their motivation. In case the equipment is very necessary from the beginning, it can be introduced in a form of lending until their motivation and initiatives are confirmed.

In the case of Lahalri SHG, the group of food processing has been expecting support of equipment to start food processing. However, the project did not provide any equipment at the beginning observing their willingness on the activity, encouraging them with technical support to try with what they have. The project supported with the ingredients of the processed food after a training for them to make trial product. They could not be satisfied with the first product, and struggled to improve quality. On the second season, they could make them better, though still with support of ingredient, and started even some different product. Once they prepared a good quality product, they started selling to neighbours, albeit a small amount. When they found their product can be sold and demand is high, they planned to expand their production and requested the project for support. The project, having observed the progress of their activities, proposed to support a half of the cost. The SHG purchased a grinding machine with their own expenses collected from the members while the project supported the attached motor for the grinder. With the grinder, they remarkably increased their production and profit. Since they have recognized the real needs of the equipment for them and confidence to develop their product, they did not have any problem in contributing for the equipment. They can even effectively utilize the equipment as they have contributed by themselves, instead of being given as a free gift.

(7) Examples of the constraints faced in the pilot sites and counter actions taken

1) Formation and Development of Shiv Shakti SHG for group farming activity

	Constraints	Countermeasures
Technical issue in cultivation	Lesser germination of nursery seedlings of cauliflower and Broccoli from groups own nursery resulting in shortage of seedlings. This was because SHG members gave excess water to the seedlings through a water pipe resulting in disturbing the seedlings and some of them got eroded and washed away with the water.	1. The members were asked to irrigate the nursery with watering can in order to irrigate the nursery beds uniformly. 2. Duties were assigned to the members (who reside nearby) to irrigate the nursery and to monitor the seedling growth.
	The rodents resulted in damaging the seedling (cauliflower, broccoli) up to 50% and this severely affected the final output of the crop.	1. Tying nylon ropes around the boundaries of the field to scare away the rodents 2. Had a stock of additional seedlings and they were subsequently planted in place of dead seedlings. 3. Phorate (insecticide) granules were used around the boundaries (the smell of the insecticide would act as a buffer and the rodents won't enter the field).
	Problems related to monkey menace and stray animals. Monkey raided the SHG field during the harvesting time and damaged the cauliflower and cabbage curds.	1. The SHG members who resided nearby to the field took upon the responsibility of guarding the field from monkeys. 2. The other members started working (weeding, irrigating and harvesting) during the evening hours when the possibility of monkey attack was the highest. 3. The applying of insect net over the vegetables also helped in protecting them from monkey attack.
	Repeated sowing of the cauliflower seedlings due to continuous rodent attack has resulted in delayed curd formation. This delay in curd formation further increases the chance of insect and pest attack due to advent of summer.	Foliar spray of urea 2% (40gm in 2lt of water) was done to increase the curd size.
	The SHG members were unable to irrigate the fields due to blockage in the outlet.	1. The matter was bought to the notice of the GMKVA. 2. The SHG members used the water from a tap (of one of its member whose house is nearby) for irrigating the vegetables. 3. As the irrigation requirement of the SHG fields was high the members bought a drum and a tub (from their homes) to the field to store water for irrigation.
	Aphid attack on Cauliflower	Imadacloprid at 1gm/3lt of water was sprayed over the cauliflower curds.
	Detection of blight disease on the colocasia leaves.	Cutting the infected leaves and spraying of fungicide Ridomil @ 2.5gm/lt., second 2nd Spray of fungicide was done after 10 days.

	Detection of Okra borer in the okra fields.	Spraying of insectide @1ml/lt of water to check borer in Okra.
Marketing	Problems faced in marketing of Okra in local market yard as the produce was less.	The group members opt for direct marketing by selling okra to their take neighbors, tenants and the Lahalri villagers.
	The SHG members intend to participate in Hamir Utsav to gain marketing experience but they do not have any products to market in the Hamir Utsav.	The members sow some flower nursery, prepare ½ kg packs of colocasia, and prepare some packets of spices like turmeric, chili powder and ginger.
	Lack of good rates for corriander, mustard and spinach in marketing yard due to abundance of stock.	The SHG members take the initiative of selling it to the Lahalri villagers, Bypass laborers, neighbors and their tenants at the ongoing retail rate.
Management and institutional issues	Cultivation of cauliflower and broccoli resulted in increased workload and care for the SHG members.	For the upcoming season they opted for cultivation of Colocasia and okra; which does not require much of work, care and is free from monkey menace.
	Heavy work like preparation of beds was a tough and tiring job for the SHG members and this somehow irritated the members and their motivation was also reduced.	To reduce the burden on the SHG members the members were made to work for short durations during the bed preparation stage.
	Dispute among the group members on work distribution- Some of the SHG members felt that few members in the group are not committed enough (they are late for the work and are not doing the assigned tasks) for the group activities. This caused a rift among the members and few of the members in the group stopped talking among themselves.	1. Problem analysis by the TCP team. 2. Identifying the disgruntled members. 3. Discussions with the other members on this issue. 4. Facilitating the problem solving by guiding and motivating the concerned members to solve the dispute amicably for the larger interest of the group.
	In phase 2 activities there were quite a few members who were not happy with equal sharing of profit by all the SHG members.	It was decided that an attendance sheet would be used for recording the group member's participation for the ongoing activity. This would further ensure the sharing of the profit on the basis of the actual work days put in by the members for the said activity.
	The landowner of one of the fields refuses to provide land for upcoming season.	The group members negotiate and arrange another field for undertaking future cultivation activities.
	Post participating in the Hamir Utsav, the SHG members show their resentment in marketing small and minor products in a public platform. They feel that it will spoil their family name.	The group decides that it will concentrate on its cultivation activities but will marketing their produce from their farms only.
	Due to area expansion under vegetables some of the SHG members found it hard (due to frequency of workload) to go to fields because they are a bit far away from their homes.	For the upcoming season they are planning to hire land in the vicinity of their houses and thus work by forming 2-3 sub groups.

2) Reformation and development of Naman SHG for seedling raising activity

	Constraints	Countermeasures
Technical issue in nursery preparation	Lesser germination of seedlings than anticipated- due to improper irrigation methods (by pipe) and continuous pest attack.	1. Additional seedlings were sown in the empty spaces in the nursery bed. 2. The group purchases a watering can from their group's savings for irrigating the nursery.
	Some members having doubts over the nursery sowing technique introduced by the TCP i.e. 1. Space to be left between the seedlings(the SHG members wanted to sow the seedlings densely to fill the void if the germination percentage of the seedlings in not good) 2. The SHG members felt that the TCP was recommending too much gap between the lines of the nursery.	1. In order to clarify the group member's doubt, the TCP asked them comparatively sow some seedlings as per their (TCP's) recommendation and the rest as per their traditional practice. 2. Post germination, the comparative analysis (based on germination percentage and the health) of the seedling were undertaken and it was found out that the seedlings sown by the TCP's method were much healthier and dense as compared to the seedlings sown by the traditional method.
	Seedling dying due to termite problem and curling of leaves.	1. Soil drenching of chlorpyriphos@2.5ml/ltr of water was done. 2. Regular maintenance and upkeep (weeding and irrigation) of nursery was done.
	Detection of fungal disease in cauliflower nursery in plug trays.	Spraying fungicide Bavistin @ 2g/lt over the cauliflower.
	Detection of insects in cauliflower nursery.	Spraying of insecticide @ 1ml/lt over the cauliflower nursery.
	Insect attack and fungal diseases detected in broccoli and cauliflower seedlings (Hamir Utsav).	Spraying of Fungicide (Bevistin @1g/1lt of water and Chloropyriphos @ 1ml/1lt of water) over the seedlings.
	Delay in germination of seedlings and rotting of seedling due to bad weather conditions.	Re sowing was undertaken.
	Problem of less germination and slow growth in bed nursery due to cold weather conditions.	Poly sheet has been applied over the nursery.
Marketing	Problems faced in marketing of nursery: 1. The women could not find buyers in the village. 2. According to some people the price of the nursery was high. 3. Delay in marketing of nursery resulted in overgrowing of the nursery seedlings. 4. The group members were reluctant in moving out to sell the nursery.	1. The SHG members lowered the price of nursery seedlings from 10 rupees to 5 rupees to dispose them at the earliest (because no one would buy overgrown seedlings). 2. The SHG members started showcasing and publicizing their nursery at every meeting and training being organized by the TCP in Lahalri. 3. The group members stated taking demand based order from nearby relatives and friends. 4. The SHG members sent their children to the Hamirpur bus stand to sell the nursery seedlings. 5. Buoyed by the returns (through nursery sale) that the group was getting, 3 of SHG members took about 100 seedlings to the nearby Baru market for selling.

Management and Institutional issue	Reluctance of SHG members in sharing the seedlings and earnings with members who had not participated in the activity.	The TCP facilitated the members to take a positive decision on it and in the end it was decided that the non active members would get some share of the seedlings as they might work during the next activity.
	The group has not updated and maintained the activity register and account book of the group.	The TCP facilitated and guided the group members to maintain the activity register and the account book.
	Lack of activity for group as nursery preparation is a seasonal activity.	The members decide to undertake ginger and okra cultivation in rainy season to ensure continuity of activity for the group.
	Discontent arising among the group members due to work management related issues.	The TCP listened to the grievances of the members and facilitated them to solve the issue in a way which is acceptable to all. It was decided that they members will undertake the care of the nursery seedlings by forming sub groups.
	Delay in sowing and losses due to unfavorable weather condition have disheartened the members.	The TCP regrouped and motivated the members to take addition care of the nursery in order to improve their financial prospects from the activity.

3) Activation and development of Bhole Shankar SHG for food processing activity

	Constraints	Countermeasures
Technical issues in nursery preparation	Problems faced in initiating trial production of food processing activity due to bad weather conditions	1. To keep the SHG members occupied and motivates the members were given the option of opting for some cultivation activity or some manufacturing activity like soft toy making etc. 2. When doing a seasonal activity one should plan a parallel activity which can be done when the seasonal raw material for that particular activity has been exhausted. In case of Bhole Shankar SHG the group members zeroed on bari and papad making as other income generation activity.
	Problems faced during trial production and its marketing. (Preparing a value added product and perfecting it takes time and some material may also be wasted)	1. Initial material support in form of pulses and ingredients was provided for the SHG members to practically learn and improve quality before they can make good enough for selling. 2. Regular follow up by the TCP and continuous monitoring of the members efforts helped in perfecting the product.
	Hindrance in continuation of food processing activity due to bad weather conditions. (especially dehydrated products)	Planning in consideration of season was introduced. The plan should be practical and flexible to be adjusted according to the abnormal and unexpected weather situation. The group members have been suggested to prepare enough products during preferable season and store properly preserving them in airtight containers to meet off season orders.
Marketing	Problem of surplus- processed food stock which could not be sold in local fairs.	The members distributed some of the produce among themselves and the remaining products were sold to nearby relatives and friends. However, through the fair, members learnt which products have higher demand and started planning their production according to the demands. Therefore, the opportunity of the fairs are important not only to sell the products in the fair but also to learn about customers and demands for marketing of their products.

Management and Institutional issue	Problems faced in selecting the activity for the group.	1. Sufficient time and space was given to the members to rethink and finalize the activity of their choice. 2. Despite this when the group was unable to finalize the activity then the SHG members were facilitated and provided with a menu of potential activities which they could undertake. 3. Priority was given to activities where the group members could use the natural resources around them, which are innovative and which do not require much time. 4. Training needs to support the selected activities were identified and undertaken at relevant time.
	Problems in mobilizing non homogeneous SHG members for activity purpose.	During formation of SHG group, care should be taken that the group being formed is homogeneous in nature. However, in case of groups like the Bhole Shankar (which was formed 8 years back with geographically diverted members) some special measures were undertaken when mobilizing the group for meetings and trainings: 1. The group members are being informed few days prior about the proposed meeting and training with enough information. 2. The place selected for the activity is assessable to all.
	Problems related to group dynamism and maintaining the motivation level of the SHG.	1. In order to maintain the motivation and interest of the group, the individual feats and achievements of its members were discussed and due recognition was provided to them. 2. Regular follow up and facilitation was undertaken to maintain their interest and confidence in perfecting some value added product at their homes. 3. Problems were identified and discussed with the members during their monthly meetings and accordingly a solution acceptable to all was implemented. 4. Training on problem solving and conflict management was helpful to resolve issues related to group dynamism.
	SHG members were not satisfied with the earnings generated by Bari production.	1. TCP facilitated the group members in preparation of a production budget for bari preparation. 2. Upon completion of production budget the group decides to prepare two kind of Bari to increase their profit margin. One without spices- priced as per the ongoing market and second type, with spices – higher priced due to use of additional spices. Those with added value are sold with higher price with a very small increase of cost.
	Problem of maintaining continuity in groups because most of the food activities are seasonal.	The group members started cultivation activities in addition to the food processing activities during off season for food processing.
	Due to non homogeneous nature of the SHG its members are facing problems in assembling and working together.	The members have decided to work and cultivate by forming sub groups which are homogeneous in nature.

4.6 Lessons Learned in Marketing

It is intimated that farmers in the pilot area have less experience on vegetable cultivation on a commercial basis. In other words, they cultivate vegetables for their home consumption, thus they have no experience for marketing of vegetables.

Considering the above situation, we have conducted certain training activities in order to promote selling vegetables. Especially on marketing, we have tried to carry out some training activities, aiming at enhancement and improvement of consciousness to marketing, selling, etc. Experiences as well as findings obtained through our activities to farmers so far are shown as follows:

1) Importance on improvement of farmers' awareness to marketing

Currently major crops in the pilot area are food crops such as wheat in winter season and maize in summer season for home consumption. Meanwhile vegetables are cultivated in kitchen garden for home consumption. Therefore they don't have sufficient experience as well as skills for vegetable cultivation. Additionally, they have no idea on selling vegetables. It is, however, understandable that vegetable cultivation provide more profit rather than food crops. Further it is intimated that farmers in the pilot area have good situation, in which they can cultivate vegetables effectively under the irrigation system. Farmers are strongly requested that they should produce vegetables, depending on the demand of consumers as well as marketers.

2) Necessity of stepwise support

As shown in the above sections, it is intimated that farmers have no sufficient experience as well as skills for vegetable cultivation. Therefore it is not easy to teach advanced skills and knowledge to those farmers from the initial stage. Initially, it is proposed that farmers should get skills to increase productivity of vegetables. Therefore it is expected that farmers get quality products. As next step, farmers should focus on improvement of quality as well as seeking good market for high value products.

3) Importance of organization

It is intimated that group activities such as grading, sorting, and marketing have certain advantages for producers. However group activities are difficult for farmers in the pilot area, because they have no experience for group activities. Farmers should understand merits of group activities, hence it is proposed that farmers try to conduct grading, sorting, and marketing by groups. Initially, farmers should organize small groups, in which farmers can share same understanding on activities and advantages.

4) System for promotion of motivated farmers

It is intimated that farmers can sell their vegetables in wholesale market easily, and hence get certain income from products. Furthermore farmers can get more income, if they want more benefit. It is depending on their willingness on marketing. So it is suggested that more instruction should be provided to advanced and motivated farmers. Extension officers should give more opportunities to those farmers for differentiation. Namely it is not so important to provide training programs to farmers equally.

5) Improvement of marketing, considering the existing infrastructure

It is intimated that there are currently various marketing channels for farmers such as wholesale markets and famers' markets, which are managed by the Marketing Board, private companies, retailers, etc. Out of those marketing channels, wholesale markets are the most common marketing channel. Meanwhile the Board has marketing strategy on improvement of function of wholesale markets for high value crops such as off-season vegetables, exotic vegetables, etc. It is expected that farmers should utilize those existing infrastructure effectively.

6) Importance of establishment of system to understand needs of consumers as well as marketers

Farmers should not press their value or understanding on consumers. Namely it is important to adopt proper farming practices, varieties, standard on quality and packing, consider needs of consumers as well as marketers.

7) Women's power for market promotion

In general, women are eager to do agricultural activities rather than men. However, men don't prefer that women are proactive in public. Men's understanding to women's activities is required for market promotion, because women are key players for vegetable cultivation as well as selling products.

8) "Practice makes perfect"

It is understandable that marketing is like small business. Marketing is unknown activity for farmers in the pilot area. What they have to do is to face a new experience. It is assured that independent activities of farmers are important in order to run a self-sustaining business.

9) Utilization of regional performance

Consumers need more fresh and safe produces. Farmers in the pilot area can produce vegetables, which are fresher rather than produces from outside. Further it is easy for farmers to get needs and requirements from consumers as well as marketers because they cultivate vegetables near wholesale market and city centre.

CHAPTER 5

VALUE ADDED SUBJECTS

Through the JICA TCP activities that is training of core extension officers as well as implementation of crop diversification in the pilot area, some value added subjects transferred to the PMU, in order to effectively conduct training of farmers, and promote crop diversification under JICA ODA loan, and other similar schemes smoothly.

Outline of those value added subjects are shown in ANNEXURE-3, and summarized as follows:

Table 4.1 Outline of Value Added Subjects

Components	Value Added Subjects	Contents	Reference
(1) Extension	Formulation of Annual Extension Training Plan	In order to promote crop diversification, and conduct capacity development of extension officers of the PMU, the training needs assessment was done. After prioritization of their needs, annual training schedule was prepared.	ANNEXURE-3 1/26
	Formulation of Crop Diversification Plan	After having information about the existing cropping system, the importance of vegetable cultivation is discussed with the beneficiaries and their interest to bring crop wise and season wise area is recorded. Year wise increment is also considered to achieve the targets.	ANNEXURE-3 2/26
	Introduction of PDCA Cycle	PDCA means Plan, Do, Check, and Act. It is expected that activities are conducted smoothly, and modified effectively, applying PDCA cycle. This concept should be adopted in the implementation of projects as well as daily activities in the office.	ANNEXURE-3 3/26
(2) Water Management and O&M	Fixation of Water Tariff and Record Keepings	Methods to fix water tariff and to keep various records have been prepared in both English and Hindi in Guidelines on water management by water users' association.	ANNEXURE-3 4/26
	Monitoring Method to Secure the Sustainability of Irrigation Projects	Monitoring sheet for securing the sustainability of irrigation project, and also its managing method were prepared in Guidelines on water management by water users' association.	ANNEXURE-3 5/26
	Method of Irrigation Water Use	New water distribution method which contains block rotation in pre-planned method based on request based method was proposed in Guidelines on water distribution.	ANNEXURE-3 6/26
	Operation of Irrigation Facilities	Precaution of pump operation, trouble shooting to no water lifting, attention to be made in valve and tank operation and others was prepared in Guidelines on operation of irrigation facilities.	ANNEXURE-3 7/26
	Maintenance of Irrigation Facilities	Method of maintenance of main irrigation facilities such as diversion weir, pumping facilities, water storage tank, open channel and pipeline was prepared in Guidelines on maintenance of irrigation facilities.	ANNEXURE-3 8/26
	Guidelines for Extension Officers on Water Management and O&M of Irrigation Facilities	Activities needed to strengthen WUAs and detailed contents & procedure of the activities was prepared in Guidelines for Extension Officers on water management and O&M of irrigation facilities for crop diversification.	9/26
(3) Vegetable Farming and Post Harvest	Nursery Production	It is proposed to use vermiculite, coco-peat and perlite to grow healthy and disease-free nursery in plug trays.	ANNEXURE-3 10/26

Components	Value Added Subjects	Contents	Reference
	Removal of lower leaves of Okra	Soft and tender fruits should be harvested. Frequent pickings are necessary for getting better quality and handsome price. Fruiting is nutrition-consuming stage so that every leaf attached with okra should be removed after harvesting. If lower leave retained, nutrition would be used by lower leaves. In addition, it promotes aeration and reduces disease incidence and ultimately makes harvesting easier.	ANNEXURE-3 11/26
	Rejuvenation pruning	In the end of July, sometimes yield decreased or bad fruits are observed. It is the time to prune back strongly.	ANNEXURE-3 12/26
	Use of cutting for multiplication of vegetables	Vegetative multiplication (vegetative propagation, vegetative cloning) is a technique of asexual reproduction in plants. This is an agricultural and horticultural method to multiply plant by inserting a part of the stem of mother plant (called cutting) to media, to expect the formation of adventitious shoots and roots.	ANNEXURE-3 13/26
	Grafting of vegetables	It is a horticultural technique whereby tissues from one plant are inserted into those of another so that the two set of vascular tissues may join together.	ANNEXURE-3 14/26
	Use of poly mulch	Poly mulch is a new technique for famers in the State of Himachal Pradesh and not too many people knew about it.	ANNEXURE-3 15/26
	Use of poly cloth for nursery production	In winter season, some parts of Himachal Pradesh are frost prone, so to avoid frost to some extent farmers are not aware about this technique of use the poly cloth.	ANNEXURE-3 16/26
	Hands-on training	The term, "Hands-on", literally means touch the hand laying on of hands. It is education term for hands-on learning experience. Hands-on training is an experiential approach to trainees. Especially this is effective for new learners. There are 3 steps of hands-on training.	ANNEXURE-3 17/26
	On-the-job training	The on-the-job training (OJT) approach is to be taken to facilitate the technical dissemination among communities since hands-on training could only cover limited number of participants. Through hands-on training, core extension staffs could be experienced and skillful learner. He/She can guide other extension staffs/farmers as a role model (Behavior model).	ANNEXURE-3 18/26
	New pictorial manuals with hints and tips	Manuals include so many illustrations and photos, in order to promote easy understanding.	ANNEXURE-3 19/26
(4) Design and Construction	Torrent Intake	This weir is a structure that takes water from the downstream side, and that stably intake only necessary flow rate. Further garbage or Rock flowing from upstream are removed by screen that is installed intake parts and they flows to downstream.	ANNEXURE-3 20/26
	Progress control, Quality control by photo	It is necessary to keep construction records of irrigation facilities.	ANNEXURE-3 21/26
	Schedule control	We have to carry out a process management actively.	ANNEXURE-3 22/26
(5) Gender	Gender Sensitization of the PMU Officers	In Himachal the terminology gender is associated with women only, which is not true as gender distinctions are defined on the basis of socio	ANNEXURE-3 23/26

Components	Value Added Subjects	Contents	Reference
		cultural factors of the society.	
	Reorienting extension approach on SHG training	Enhancing the capacity of the extension officers to the level where they are confident and trained enough to act as SHG trainers	ANNEXURE-3 24/26
	Mulberry leaf processing technique and benefits	Mulberry has been traditionally used as a fodder and the people were not aware about the nutritious properties and the health benefits which could be derived from mulberry leafs.	ANNEXURE-3 25/26
	Handbook of food processing and reference	Lack of nutritional information has led to severe nutritional deficiencies in our dietary profile. The booklet is aimed at providing information on various value added recipes along with introducing measures related to overcome nutritional deficiencies and market stagnation.	ANNEXURE-3 26/26

ANNEXURE 1

FORMS FOR EXTENSION ACTIVITIES

Annexure 1.1 (1/3)

Annual Agricultural Production Plan and Progress after Completion of Construction in Kharif Season

Sub- project: | DPMU: | BPMU: | Staff in charge:

Farm land in sub-project area: ha | No. of HHs | No.of farmers: | Date:

Existing Condition 0 year ( )					Proposed Condition after Constructio									
Crops	Area		Unit Yield (ton/ha)	Production (ton)	1st Year ( )				2nd Year ( )				3rd Year ( )			
	Rev. (ha)	PRA (ha)			Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)
Total vegetable area																
% area under vege.																
Total					Total				Total				Total			

Progress after Completion of Construction												
1st Year ( )				2nd Year ( )				3rd Year ( )				
Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	
Total vege area.												
% vege area												
Total				Total				Total				

Annexure 1.1 (2/3)

Annual Agricultural Production Plan and Progress after Completion of Construction in Rabi Season

Sub- project: | **DPMU** | **BPMU** | **Staff in charge:**

Farm land in sub-project area: ha | **No. of HHs** | **No.of farmers:** | **Date:**

Crops	Existing Condition 0 year ( ) Area Rev. (ha)	Area PRA (ha)	Unit Yield (ton/ha)	Production (ton)	Proposed Condition after Constructio 1st Year ( ) Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	2nd Year ( ) Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	3rd Year ( ) Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)
Total vegetable area																
% area under vege.																
Total					Total				Total				Total			

Progress after Completion of Construction 1st Year ( ) Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	2nd Year ( ) Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	3rd Year ( ) Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)
Toat vege area											
% vege area											
Total				Total				Total			

Annexure 1.1 (3/3)

Annual Agricultural Production Plan and Progress after Completion of Construction in Zaid Season

Sub- project: DPMU BPMU Staff in charge:

Farm land in sub-project area: ha No. of HHs No.of farmers: Date:

(From month to----------month)

Crops	Existing Condition 0 year ( ) Area Rev. (ha)	Existing Condition 0 year ( ) Area PRA (ha)	Existing Condition 0 year ( ) Unit Yield (ton/ha)	Existing Condition 0 year ( ) Production (ton)	Proposed Condition after Constructio 1st Year ( ) Crops	1st Year ( ) Area (ha)	1st Year ( ) Unit Yield (ton/ha)	1st Year ( ) Production (ton)	2nd Year ( ) Crops	2nd Year ( ) Area (ha)	2nd Year ( ) Unit Yield (ton/ha)	2nd Year ( ) Production (ton)	3rd Year ( ) Crops	3rd Year ( ) Area (ha)	3rd Year ( ) Unit Yield (ton/ha)	3rd Year ( ) Production (ton)
Total vegetable area																
% vegetable area																
Total					Total				Total				Total			

Progress after Completion of Construction

Crops	1st Year ( ) Area (ha)	1st Year ( ) Unit Yield (ton/ha)	1st Year ( ) Production (ton)	2nd Year ( ) Crops	2nd Year ( ) Area (ha)	2nd Year ( ) Unit Yield (ton/ha)	2nd Year ( ) Production (ton)	3rd Year ( ) Crops	3rd Year ( ) Area (ha)	3rd Year ( ) Unit Yield (ton/ha)	3rd Year ( ) Production (ton)
Total vege area											
% vege area											
Total				Total				Total			

Annexure 1.2

Annual Schedule on Construction of Irrigation Facilities and Extension Training Program for Farmers

Sub-project: **DPMU:** **BPMU:** **Staff in charge:**

Sub-project area: ha **No. of HHs** **No.of farmers:** **Date:**

Activities	Trainings Done before completion of irri. Scheme	-1 (Year:)												1 (Year:)												2 (Year:)												3 (Year:)											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
A. **Infrastructure Development and Improvement**																																																
1. **Minor Irrigation System**																																																
1.1 Construction of Minor Irrigation System																																																
1.2 Improvement of Minor Irrigation System																																																
1.3 Survey, Investigation & System																																																
2. **Access Farm Road**																																																
2.1 Construction of Access Farm Road																																																
2.2 Improvement of Access Farm Road																																																
2.3 Survey, Investigation & System																																																
3. Micro Irrigation System for Demonstration																																																
3.1 Construction of Micro Irrigation System																																																
i Micro Irrigation System																																																
4. Handholding support service (O&M by farmers group)																																																
B. **Infrastructure development support**																																																
1. **Induction workshop for community motivators**																																																
2. **Awareness camp involving community**																																																
3. **Formation and formalization of farmers group**																																															
3.1 Workshop of group to develop objectives and norms																																																
3.2 Training to MC members on role and responsibility																																																
3.3 Exposure visit of MC members to WUA in other states																																																
4. **Capacity development of farmers groups on participatory, management process and institutional development**																																																
4.1 Training of MC members																																																
4.2 Training of women members																																																
4.3 Workshop on resource mobilization and revenue collection																																																
4.4 Training on accounting principles and practices																																																
4.5 Training of SHG members																																																
4.6 Training of office bearers of SHG																																																
4.7 Workshop of SHG members																																																
4.8 Refresher training of MC members																																																
5. **Capacity development of MC members on O&M of irrigation and water management**																																																
5.1 Workshop to discuss principal and practices																																																
5.2 Training on micro planning tools and techniques																																																
5.3 Field training on basic engineering skills																																																
6. **Promotion of federation of farmers groups**																																																
6.1 Workshop for cluster federation development																																																
6.2 Training for efficiency development of members																																																
6.3 Workshop for development of federation																																																
6.4 Workshop for development of Apex Federation																																																
7. **Provision for support services**																																																
7.1 Support services																																																
C. **Farmers support program**																																																
1. **Vegetable promotion**																																																
1.1 Orientation and need assessment																																																
1.2 Farm management																																																
i Training of bookkeeping																																																
ii Training of budgeting and monitoring																																																
1.3 Preparation techniques																																																
i Water saving and soil conservation																																																
ii Organic fertilizer and application																																																
iii Assistance for promotion of vermi-compost																																																
iv Exhibition, Kisan Mela and vegetable show																																																
v Training in application of fertilizer and micro nutrients																																																
1.4 Cultivation practice																																																
i Strategic vegetables																																																
a Cauliflower	①Nursery management ②Transplanting/sowing /Fertilizer ③Triming/Thinning ④Harvesting																																															
b Tomato																																																
c Potato and Peas																																																
d. Cucurbits & other seasonal																																																
ii Exotic vegetables																																																
1.5 Cropping pattern arrangement																																																
1.6 Organic pest management and IPM																																																
i Training of farmers' group	⑤Plant protection																																															
ii Exposure visits																																																
1.7 Post-harvest techniques																																																
1.8 Farm mechanization																																																
1.9 Micro-irrigation and poly house	⑥Water management																																															
1.10 Program for next generation																																																
1.11 Construction of collection centre																																																
1.12 Recruitment of community motivators																																																
2. **Food Grain's Productivity**																																																
2.1 Improvement of food grain productivity	①~⑥																																															
3. **Promotion of post harvest processing**																																																
3.1 Small scale agro-processing																																																
i Orientation workshop for SHG																																																
ii Training of accounting for SHG																																																
iii Training of budgeting and monitoring																																																
iv Training of organic fertilizer																																																
v Training of seedling raising																																																
vi Training of food processing																																																
3.2 Public Private Partnership																																																
D. **Institutional Development Component**																																																
2. **Strengthening of Extension Service Function**																																																
3. **Capacity Development of Community Motivators**																																																
3.1 Training on institutional development processes																																																
3.2 Training on basis of irrigation management																																																
3.3 Training on enhancing agricultural production																																																
3.4 Training on promotion and strengthening of SHG																																																
3.5 Training on facilitation for business promotion of SHG																																																
3.6 Training on fostering market linkages																																																
3.7 Exposure visit on participatory irrigation management																																																
3.8 Peer learning workshop fro community motivators																																																

Conditions)

(1) Training programs should be adopted, considering needs, requiremnt, and constraints given from farmres

(2) Training program shall be arranged every month.

(3) Training program shall be arranged for farmers group. Skill as well as information to be provided through training programs shall be shared with other famrers.

(4) Community motivator has to collect request, needs, constraints, and other data given from farmers, hence transfer to BPMU.

Annexure 1.3

Needs Assessment based on Constraints in Cultivation of Crops and Proposed Countermeasures

BPMU: Name of Sub-project:

Extension Officer: Motivator: Year:

No.	Crop	Constraints	Countermeasures			
			Trainings required	Technological demonstrations	Exposure Visits	Administrative

Annexure 1.4

Summary of Annual Training Needs of Farmers

BPMU: Name of Sub-project:

Extension Officer: Motivator: Year:

No.	Crop	Subject of training	When to arrange/ Date, time & venue	Who will organize	Number of Participants	Trainer(s)

Annexure 1.5

Enlisting of Focused Areas of Laying of Technological Demonstration Plot of Farmers Field

BPMU: Name of Sub-project:

Extension Officer: Motivator:

Date of Planning: Crop Season

Crop	Focused area of demonstration	Location of the plot	Name of plot owner	Area of plot	Date of land preparation	Arrangement of inputs (seeds, ferti., ppm etc.)	Date of sowing	Details of inter culture operations

Annexure 1.6

Action Plan for Laying of Demonstrations

BPMU:	Sub-project area:
Extension Officer	
Crop	
Season	

Purpose of demonstration:		
Focused area of demonstration:		
Variety selected:		
Date of sowing fixed:		
Arrangement of other inputs:	Seeds	
	Fertilizer	
	Sowing machinery	
	PPM	
	Man-power	
Arrangement of trainings at Critical growth stages:	Sowing	
	Weeding	
	Flowering	
	Top-dressing	
Expected output:		

Annexure 1.7

Action Plan for Arranging of Exposure Visit to Success Stories

BPMU:	Sub-project area:
Extension Officer:	
Motivator:	
Duration of visit:	
No. of farmers selected:	

Purpose of Visit:

1.
2.
3.
4.

Schedule of visit:

Date of visit	Places to be visited	Salient feature about the place of visit.	Resource person

Expected Outputs:

1.
2.
3.
4.

Annexure 1.8

Action Plan for Training of Farmers

BPMU:	DPMU:
Sub-project area:	
Title of Training:	
Date:	
Venue:	
Officer In charge:	
No. of Participants to be expected:	

Training Subjects:

Subjects	Resource Persons
1	
2	
3	

Expected Outputs:

1
2
3

Time schedule:

Time	Subject	Facilitator/ Resource Person
10:30-10:45	Registration	Motivator
10:45-11:45	Introduction of the days program	Extension Officer
11:45-12:45	Detailed training activities	
13:00-14:00		

Annexure 1.9

Report on Training of Farmers

BPMU:	DPMU:
Sub-project area:	
Title of Training	
Date:	Venue:
Officer In charge:	No. of Participants:

Objectives:

1
2
3

Training Activities:

Subjects discussed / Essential Points	Resource Persons
1	
2	
3	

Time schedule followed:

Time	Subject	Facilitator/ Resource Person
10:30-10:45	Registration	Motivator
10:45-11:45	Introduction of the days program	Extension Officer
11:45-12:45	Detailed training activities	
13:00-14:00		

Outputs:

1
2
3

Conclusion (Lesson Learned):

1
2
3

Annexure 1.10

Information on Performance of Crop Demonstration

BPMU: Name of Sub-project:

Extension Officer: Motivator:

Date of Planning: Crop Season:

Crop	Focused area	Location & size of plot	Date of sowing	Details of inputs used (seed, ferti, ppm etc.)	Details of inter culture operations	Dates of harvesting	Yield	Observations /suggestions

Annexure 1.11 (1/2)

Report on Organization of Field Day

Crop:	Title / Subject:	
Date:	DPMU:	BPMU:
Place:	Extension Officer:	
No. of Participants:		

Training Activities:

Subjects discussed / Essential Points	Resource Persons
1	
2	
3	

Time schedule followed:

Time	Subject	Facilitator/ Resource Person
10:30-10:45	Registration	Motivator
10:45-11:45	Introduction of the days program	Extension Officer
11:45-12:45	Detailed training activities	
13:00-14:00		

Outputs:

1
2
3

Conclusion (Lesson Learned):

1
2
3

Annexure 1.11 (2/2)

Report on Organization of Field Day – Photo Album

Subject :
Place :

	
Title of Photo : Date :	Title of Photo : Date :
	
Title of Photo : Date :	Title of Photo : Date :
	
Title of Photo : Date :	Title of Photo : Date :

Annexure 1.12 (1/2)

Report on Exposure Visit Organized

DPMU:	BPMU:	Sub-project area:
Extension Officer:		
Motivator:		
Duration of visit:		
Places visited:		
No. of participants:		

Purpose of Visit:

1.
2.
3.
4.

Schedule of visit:

Date of visit	Places to be visited	Salient feature about the place of visit.	Resource person

Detailed report:

Date of visit	Place (s) visited	Summary of learning	Facilitator for the visit

Annexure 1.12 (2/2)

Report on Exposure Visit Organized – Photo Album

Subject :
Place :

Title of Photo :
Date :

Title of Photo :
Date :

Title of Photo :
Date :

Title of Photo :
Date :

Title of Photo :
Date :

Title of Photo :
Date :

ANNEXURE 2

LIST OF MANUALS/FORMS/STANDARDS

PART II-1 AGRICULTURAL EXTENSION

Code	Subject	Sub Code	Name	Source	Type
EX-01	Training Manual for PDCA Cycle	EX-01-01	Plan-Do-Check-Act Cycle	JICA TCP	PPT
		EX-01-02	Basic Concept of PDCA Cycle	JICA TCP	PPT
		EX-01-03	PDCA and Crop Diversification	Nauni University	MS WORD
EX-02	Training Materials for Adoption of PDCA Cycle	EX-02-01	Practice of Plan (Number and Date)	JICA TCP	PPT
		EX-02-02	Practice for Do for Extension Officers	JICA TCP	PPT
		EX-02-03	Practice of Check (Statistics)	JICA TCP	PPT
		EX-02-04	Practice for Check (Nursery Problem)	JICA TCP	PPT
		EX-02-05	Practice for Check (Lodging Paddy Rice)	JICA TCP	PPT
		EX-02-06	Practice of Check (Root Question)	JICA TCP	PPT
		EX-02-07	Practice for Check especially Evaluation (Quantitative Analysis)	JICA TCP	PPT
		EX-02-08	Practice for Act	JICA TCP	PPT
		EX-02-09	Monitoring and Evaluation	JICA TCP	PDF

PART II-2 INFRASTRUCTURE DEVELOPMENT

Code	Subject	Sub-Code	Name	Source	Type
ENG-01	Planning	ENG-01-01	TOR for Survey Work	JICA TCP	Word File
		ENG-01-02	Contract for Topographic Survey in Lahalri, Hamirpur for Technical Cooperation project for Crop Diversification in Himachal Pradesh.	JICA TCP	PDF
		ENG-01-03	Sample Letter on work & Commencement Order for Topographic Survey	JICA TCP	Word File
		ENG-01-04	Crop Water Requirement	JICA TCP	PPT
		ENG-01-05	Steps Involved in Planning, Designing & Cost Estimation of Irrigation Scheme	JICA TCP	PPT
		ENG-01-06	Training on Management of Investigation/Planning/Designing/Construction of Irrigation Project.	JICA TCP	PPT
		ENG-01-07	No Object Certificates of Beneficiary	JICA-TCP	PDF
		ENG-01-08	Process of Supply of Power (SOP) and Meter Connection	JICA-TCP	PDF
ENG-02	Design	ENG-02-01	Check Sheet for General Information	JICA TCP	Excel File
		ENG-02-02	Design drawings L-section & C-section of pipeline (Contained only in CD separately)	JICA TCP	CD
		ENG-02-03	Design Report (Contained only in CD separately)	JICA TCP	CD
		ENG-02-04	Cost Estimate (Sample)	JICA TCP	Excel File
		ENG-02-05	Practical Handbook on Public Health Engineering	ER. GS BAJWA	PDF
		ENG-02-06	Training on Auto CAD 2010 (Autodesk official training guide, Auto CAD 2010)	Dr. Hement Vinayak	PDF
		ENG-02-07	Auto CAD Command Shortcuts	Dr. Hement Vinayak	PDF
		ENG-02-08	Training on Total Station	Mr. Chander Prakash	PPT
EN -03	Tender	ENG-03-01	Tender Schedule	JICA TCP	Excel File
		ENG-03-02	Technical Cooperation Project for Crop Diversification for Himachal Pradesh, Tender Process.	JICA TCP	PPT
		ENG-03-03	Bidding Document under Japanese ODA Loans for Tender Committee	JICA TCP	PPT
		ENG-03-04	Technical Cooperation Project for Crop Diversification for Himachal Pradesh, Notice Inviting Tender	JICA TCP	Word File
		ENG-03-05	Tender Document Package-1 & 2 (Contained only in CD separately)	JICA TCP	CD
		ENG-03-06	Tender Drawing Package-1 & 2 (Contained only in CD separately)	JICA TCP	CD
		ENG-03-07	Pre -Tender Meeting Schedule	JICA TCP	PPT
		ENG-03-08	Pre -Tender Meeting Design	JICA TCP	PPT
		ENG-03-09	Instruction to Participants of Pre-Tender Meeting	JICA TCP	PPT

		ENG-03-10	Addendum	JICA TCP	Word Files
		ENG-03-11	Tender Opening (Tender Prices readout)	JICA TCP	Excel File
		ENG-03-12	Assessment of Tenders Package-1 & 2 (Contained only in CD separately)	JICA TCP	CD
		ENG-03-13	Contract Agreement for Construction of Pilot Scheme Package-1 & 2 (Contained only in CD separately)	JICA TCP	CD
		ENG-03-14	Agenda for Pre-Contract Meeting	JICA TCP	Word File
		ENG-03-15	Minutes of Pre-Contract Meeting in 2nd Nov	JICA TCP	Word File
		ENG-03-16	Minutes of Contract Signing Ceremony Meeting	JICA TCP	Word File
		ENG-03-17	Performance Bank Guarantee	Contractor	PDF
		ENG-03-18	Special Power of Attorney	Contractor	PDF
		ENG-03-19	Sample Bidding Documents under Japanese ODA Loans	JICA	PDF
		ENG-03-20	Percentage/Item Rate Tender & Contract for Works	Gov. of Himachal Pradesh IPH	PDF
		ENG-03-21	Item Rate-Tender and Contract for Works for the Guidance of Contractors, General Rules and Directions for the Guidance of Contractor	Gov. of Himachal Pradesh DoA	PDF
		ENG-03-22	Standard Bidding Document of Civil Work	Gov. of INDIA	PDF
		ENG-03-23	CPWD Works Manual (2007)	Gov. of INDIA CPWD	PDF
		ENG-03-24	CPWD Specifications (Vol.1, 2009)	Gov. of INDIA CPWD	PDF
		ENG-03-25	Analysis of Rate (Vol.1 2007, Reprint 2010)	Gov. of INDIA CPWD	PDF
ENG-04	Construction Management	ENG -04-01	Organization Structure	JICA TCP	Excel Files
		ENG -04-02	Instruction Slip	JICA TCP	Excel File
		ENG -04-03	Daily Report	JICA TCP	Excel File
		ENG -04-04	Weekly Report	JICA TCP	Excel File
		ENG -04-05	Contractor's Weekly Schedule	JICA TCP	Excel Files
		ENG -04-06	Over all Work Plan	JICA TCP	Excel Files
		ENG -04-07	Construction Schedule	JICA TCP	Excel Files
		ENG -04-08	Revise Construction Schedule	JICA TCP	Excel Files
		ENG -04-09	Minutes of Weekly Meeting	JICA TCP	Word File
		ENG -04-10	Meeting with Contractor Check List	JICA TCP	Word File
		ENG -04-11	Social Environment	JICA TCP	Excel File
		ENG -04-12	Record of Visitor	JICA TCP	Excel File
		ENG -04-13	List of IS Code	JICA TCP	Word File

		ENG -04-14	Actual Minutes of Weekly Meeting	JICA TCP	Word File
		ENG -04-15	Actual Daily Report	JICA TCP	Excel/ Word Files
		ENG -04-16	Reinforcement Details	JICA TCP	Excel File
		ENG -04-17	HDPE Pipe Inspection and Stage Inspections by Photographs	JICA TCP	Excel/ Word Files
		ENG -04-18	Payment Procedure	JICA TCP	Word File
		ENG -04-19	Payment Chart	JICA TCP	Excel File
		ENG -04-20	Summary of Monthly Bill	JICA TCP	Excel File
		ENG -04-21	Payment Sheet for Reference	JICA TCP	Excel File
		ENG -04-22	Progress Control Sheet(actual)	JICA TCP	PDF
		ENG -04-23	Regularly Concrete Mixing Check	JICA TCP	Excel File
		ENG -04-24	Trial Mix Sheet	JICA TCP	Excel File
		ENG -04-25	Concrete Mixing Check Sheet(format)	JICA TCP	Excel File
		ENG -04-26	Material Component	JICA TCP	Excel File
		ENG -04-27	Regular Site Inspection List	JICA TCP	Word File
		ENG -04-28	KVS Training Module	JICA TCP	Excel File
		ENG -04-29	Repair Under Defect Liability	JICA TCP	Excel File
		ENG -04-30	Trial Mix Result	JICA TCP	Word File
		ENG -04-31	Training of Construction Management of Irrigation Facilities	JICA TCP	PPT
		ENG-04-32	As Built Drawing of Pilot Project Lahalri, Hamirpur, i.e. Intake Structure, Feeder Channel, Desilting Chamber, Retaining wall, Sump well, Pump House, C-Section from Intake to Sump well, Distribution tank, Regulation tanks, Sub tanks and Outlets, (Contained only in CD separately)	JICA-TCP	CD
		ENG-04-33	Success Story of Pilot Site Lahalri	JICA-TCP	Word File

PART II-3 WATER MANAGEMENT AND OPERATION AND MAINTENANCE

Code	Subject	Sub -Code	Name	Source	Type
WM-01	Water Management by Water Users' Association	WM-01-01	Guidelines for Water Management by Water Users' Association (WUA) (English & Hindi)	JICA TCP	Booklet (word)
		WM-01-02	Presentation slides for Water Management by WUA (English & Hindi)	JICA TCP	PPT
		WM-01-03	Formats of Records Keeping of WUA (English & Hindi)	JICA TCP	Excel
		WM-01-04	Setting up of Monitoring System for Securing the Sustainability of Irrigation Project in PMU	JICA TCP	Booklet (Word)
		WM-01-05	Guidelines for the implementation of irrigation schemes through water users' association	DoA	Booklet (PDF)
		WM-01-06	Operations & Maintenance Manual, including Water Users' Association Guidelines	PMU	Booklet (Word)
WM-02	Establishment of WUA	WM-02-01	Formation and Registration of WUA	JICA TCP	Handout (Word)
		WM-02-02	Presentation slides for Formation and Registration of WUA	JICA TCP	PPT
		WM-02-03	Rules and Regulations of WUA	JICA TCP	PPT
		WM-02-04	GMKVA Registration	JICA TCP	Booklet (PDF)
		WM-02-05	Rules & Regulations of GMKVA	JICA TCP	Handout (Word)
WM-03	Water Distribution	WM-03-01	Guidelines for Water Distribution (English & Hindi)	JICA TCP	Booklet (Word)
		WM-03-02	Presentation slides for Water Distribution (English & Hindi)	JICA TCP	PPT
		WM-03-03	Rules for Water Distribution in Lahalri Pilot Project (Report)	JICA TCP	Booklet (Word)
WM-04	Operation of Irrigation Facilities	WM-04-01	Guidelines for Operation of Irrigation Facilities (English & Hindi)	JICA TCP	Booklet (Word)
		WM-04-02	Presentation slides for Operation of Irrigation Facilities (English & Hindi)	JICA TCP	PPT
WM-05	Maintenance of Irrigation Facilities	WM-05-01	Guidelines for Maintenance of Irrigation Facilities (English & Hindi)	JICA TCP	Booklet (Word)
		WM-05-02	Presentation slides for Maintenance of Irrigation Facilities (English & Hindi)	JICA TCP	PPT
WM-06	Leadership Development	WM-06-01	Concept and Meaning of Leadership Development	Dr. Anup Katoch (CSKHPKV)	Booklet (PDF)
WM-07	Conflict Management	WM-07-01	Conflict management and role of village level leaders	Dr. J.S.Guleria (CSKHPKV)	Booklet (PDF)
		WM-07-02	Conflict Management	Dr. J.S.Guleria (CSKHPKV)	PPT
		WM-07-03	Problem Solving	JICA TCP	PPT
WM-08	Micro Irrigation – Sprinkler	WM-08-01	Micro Irrigation in Himachal Pradesh: Design of Sprinkler Irrigation System	Dr. RK Gupta (CSKHPKV)	Booklet (PDF)
		WM-08-02	Micro Irrigation System: Design of Sprinkler Irrigation Systems	Dr. RK Gupta	PPT

				(CSKHPKV)	
		WM-08-03	Design and evaluation of irrigation systems including micro-irrigations	Dr. R.S.Rana (CSKHPKV)	Booklet (PDF)
WM-09	Micro Irrigation – Drip Irrigation	WM-09-01	O&M, Fertigation and Installation of Micro Irrigation	Dr. R.S.Rana (CSKHPKV)	Booklet (PDF)
		WM-09-02	Drip irrigation, its design and application uniformity	Dr. R.S.Rana (CSKHPKV)	PPT
		WM-09-03	O&M of Drip Irrigation-(Hindi & English)	JICA TCP	Handout (Word)
		WM-09-04	O&M of Micro Irrigation	JICA TCP	Booklet (Word)
		WM-09-05	Maintenance of Poly House -(English & Hindi)	JICA TCP	Handout (Word)
WM-10 (Only for Extension Officers)	Crop Budgeting for Irrigation Scheme	WM-10-01	Planning of Cropping Pattern, Estimation of Crop Water Requirement & Crop Budgeting	JICA TCP	Booklet (PDF)
		WM-10-02	Planning of Cropping Pattern, Estimation of Crop Water Requirement & Crop Budgeting	JICA TCP	PPT
		WM-10-03	Crop water budgeting and irrigation scheduling	Dr. Sanjeev K Sandal (CSKHPKV)	Booklet (PDF)
		WM-10-04	Methods for Estimating Crop Water Requirements	Dr. RK Gupta (CSKHPKV)	Booklet (PDF)
		WM-10-05	CROPWAT8.0: Stepwise Methodology for calculation of Crop Water Requirements	Dr. RK Gupta (CSKHPKV)	Booklet (PDF)
WM-11 (Only for Extension Officers)	Irrigation Scheduling	WM-11-01	Irrigation Scheduling based on The Cropping Pattern	JICA TCP	Booklet (Word)
		WM-11-02	Irrigation Scheduling Management	Dr. Sanjeev K Sandal (CSKHPKV)	Booklet (PDF)
		WM-11-03	Irrigation Scheduling Management	Dr. Sanjeev K Sandal (CSKHPKV)	PPT
WM-12 (Only for Extension Officers)	Soil Conservation	WM-12-01	Conservation of soil moisture and rain-water harvesting	Dr. Sanjeev K Sandal (CSKHPKV)	Booklet (PDF)
		WM-12-02	Types of soil erosion and control measures	Dr. R.S.Rana (CSKHPKV)	Booklet (PDF)
		WM-12-03	Prospects, importance and uses of various farm equipment for conservation agriculture	Dr. D.K. Vatsa (CSKHPKV)	Booklet (PDF)
		WM-12-04	Manual of soil and water conservation practices	Gurmel Singh C. Ventkataramanan G. Sastry B.P. Joshi	Manual (CD)

PART II-4 VEGETABLE CULTIVATION AND POST-HARVEST

1) Technical Manuals

Code	Subject	Sub -Code	Name	Source	Type
FM-01	Technical manual on cropping pattern arrangement	FM-01-01-E FM-01-01-H	Manual on Cropping Pattern Arrangement Manual on Cropping Pattern Arrangement	JICA TCP JICA TCP	PDF PDF
FM-02	Technical Manual on farm managemen t	FM-02-01-E FM-02-01-H	Manual on Record keeping and farm planning Manual on Record keeping and farm planning	JICA TCP JICA TCP	PDF PDF
FM-03	Technical manual on field preparation techniques	FM-03-01-E FM-03-01-H	Manual on field preparation techniques Manual on field preparation techniques	JICA TCP JICA TCP	PDF PDF
FM-04	Technical manual on nursery production	FM-04-01-E FM-04-01-H	Manual on nursery raising on bed Manual on nursery raising on bed	JICA TCP JICA TCP	PDFPDF
		FM-04-02-E FM-04-02-H	Manual on nursery raising in tray Manual on nursery raising in tray	JICA TCP JICA TCP	PDFPDF
		FM-04-03-E FM-04-03-H	Manual on pot nursery raising Manual on pot nursery raising	JICA TCP JICA TCP	PDFPDF
		FM-04-04-E FM-04-04-H	Manual on plug tray nursery raising Manual on plug tray nursery raising	JICA TCP JICA TCP	PDFPDF
		FM-04-05-E FM-04-05-H	Manual on clay block nursery production Manual on clay block nursery production	JICA TCP JICA TCP	PDFPDF
FM-05	Technical manual on cultivation techniques for summer vegetables	FM-05-01-E (1) FM-05-01-E (2) FM-05-01-H (1) FM-05-01-H (2)	Manual on Tomato cultivation Manual on insect and diseases in Tomato Manual on Tomato cultivation Manual on insect and diseases in Tomato	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-05-02-E (1) FM-05-02-E (2) FM-05-02-H (1) FM-05-02-H (2)	Manual on Brinjal cultivation Manual on insect and diseases in Brinjal Manual on Brinjal cultivation Manual on insect and diseases in Brinjal	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-05-03-E (1) FM-05-03-E (2) FM-05-03-H (1) FM-05-03-H (2)	Manual on Capsicum cultivation Manual on insect and diseases in Capsicum Manual on Capsicum cultivation Manual on insect and diseases in Capsicum	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-05-04-E (1) FM-05-04-E (2) FM-05-04-H (1) FM-05-04-H (2)	Manual on Cucumber cultivation Manual on insect and diseases in Cucurbits Manual on Cucumber cultivation Manual on insect and diseases in Cucurbits	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-05-05-E (1) FM-05-04-E (2) FM-05-05-H (1)	Manual on Bottle gourd cultivation Manual on insect and diseases in Cucurbits	JICA TCP JICA TCP JICA TCP	PDF PDF PDF

		FM-05-04-H (2)	Manual on Bottle gourd cultivation Manual on insect and diseases in Cucurbits	JICA TCP	PDF
		FM-05-06-E (1) FM-05-04-E (2) FM-05-06-H (1) FM-05-04-H (2)	Manual on Bitter gourd cultivation Manual on insect and diseases in Cucurbits Manual on Bitter gourd cultivation Manual on insect and diseases in Cucurbits	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-05-07-E (1) FM-05-07-E (2) FM-05-07-H (1) FM-05-07-H (2)	Manual on Okra cultivation Manual on insect and diseases in Okra Manual on Okra cultivation Manual on insect and diseases in Okra	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-05-08-E (1) FM-05-08-E (2) FM-05-08-H (1) FM-05-08-H (2)	Manual on French bean cultivation Manual on insect and diseases in French bean Manual on French bean cultivation Manual on insect and diseases in French bean	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-05-09-E (1) FM-05-09-E (2) FM-05-09-H (1) FM-05-09-H (2)	Manual on Ginger cultivation Manual on insect and diseases in root crops Manual on Ginger cultivation Manual on insect and diseases in root crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-05-10-E (1) FM-05-09-E (2) FM-05-10-H (1) FM-05-09-H (2)	Manual on Turmeric cultivation Manual on insect and diseases in root crops Manual on Turmeric cultivation Manual on insect and diseases in root crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-05-11-E (1) FM-05-09-E (2) FM-05-11-H (1) FM-05-09-H (2)	Manual on Colocasia cultivation Manual on insect and diseases in root crops Manual on Colocasia cultivation Manual on insect and diseases in root crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-05-12-E (1) FM-05-09-E (2) FM-05-12-H (1) FM-05-09-H (2)	Manual on Elephant foot yam cultivation Manual on insect and diseases in root crops Manual on Elephant foot yam cultivation Manual on insect and diseases in root crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
FM-06	Technical manual on cultivation techniques for kharif cereals	FM-06-01-E (1) FM-06-01-E (2) FM-06-01-E (3) FM-06-01-H (1) FM-06-01-H (2) FM-06-01-H (3)	Manual on Paddy cultivation Manual on SRI paddy cultivation Manual on insect and diseases of Paddy Manual on Paddy cultivation Manual on SRI paddy cultivation Manual on insect and diseases of Paddy	JICA TCP JICA TCP JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF PDF PDF
		FM-06-02-E (1) FM-06-02-E (2) FM-06-02-H (1) FM-06-02-H (2)	Manual on Maize cultivation Manual on insect and diseases of Maize Manual on Maize cultivation Manual on insect and diseases of Maize	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
FM-07	Technical manual on	FM-07-01-E FM-07-01-H	Manual on Post Harvest Techniques Manual on Post Harvest Techniques	JICA TCP JICA TCP	PDF PDF

	harvest and post harvest of summer vegetables				
FM-08	Technical manual on cultivation techniques for winter vegetables	FM-08-01-E (1) FM-08-01-E (2) FM-08-01-H (1) FM-08-01-H (2)	Manual on Cauliflower cultivation Manual on insect and diseases of cole crops Manual on Cauliflower cultivation Manual on insect and diseases of cole crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-02-E (1) FM-08-01-E (2) FM-08-02-H (1) FM-08-01-H (2)	Manual on Broccoli cultivation Manual on insect and diseases of cole crops Manual on Broccoli cultivation Manual on insect and diseases of cole crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-03-E (1) FM-08-01-E (2) FM-08-03-H (1) FM-08-01-H (2)	Manual on Cabbage cultivation Manual on insect and diseases of cole crops Manual on Cabbage cultivation Manual on insect and diseases of cole crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-04-E (1) FM-05-09-E (2) FM-08-04-H (1) FM-05-09-H (2)	Manual on Radish cultivation Manual on insect and diseases of root crops Manual on Radish cultivation Manual on insect and diseases of root crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-05-E (1) FM-05-09-E (2) FM-08-05-H (1) FM-05-09-H (2)	Manual on Turnip cultivation Manual on insect and diseases of root crops Manual on Turnip cultivation Manual on insect and diseases of root crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-06-E (1) FM-05-09-E (2) FM-08-06-H (1) FM-05-09-H (2)	Manual on Carrot cultivation Manual on insect and diseases of root crops Manual on Carrot cultivation Manual on insect and diseases of root crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-07-E (1) FM-05-09-E (2) FM-08-07-H (1) FM-05-09-H (2)	Manual on Onion cultivation Manual on insect and diseases of root crops Manual on Onion cultivation Manual on insect and diseases of root crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-08-E (1) FM-05-09-E (2) FM-08-08-H (1) FM-05-09-H (2)	Manual on Garlic cultivation Manual on insect and diseases of root crops Manual on Garlic cultivation Manual on insect and diseases of root crops	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-09-E (1) FM-08-09-E (2) FM-08-09-H (1) FM-08-09-H (2)	Manual on leaf Lettuce cultivation Manual on insect and diseases of leafy vegetables Manual on leaf Lettuce cultivation Manual on insect and diseases of leafy vegetables	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF

		FM-08-10-E (1) FM-08-09-E (2) FM-08-10-H (1) FM-08-09-H (2)	Manual on Spinach cultivation Manual on insect and diseases of leafy vegetables Manual on Spinach cultivation Manual on insect and diseases of leafy vegetables	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-11-E (1) FM-08-09-E (2) FM-08-11-H (1) FM-08-09-H (2)	Manual on Sarson/Mustard cultivation Manual on insect and diseases of leafy vegetables Manual on Sarson/Mustard cultivation Manual on insect and diseases of leafy vegetables	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-12-E (1) FM-08-09-E (2) FM-08-12-H (1) FM-08-09-H (2)	Manual on Fenugreek cultivation Manual on insect and diseases of leafy vegetables Manual on Fenugreek cultivation Manual on insect and diseases of leafy vegetables	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-08-13-E (1) FM-08-13-E (2) FM-08-13-H (1) FM-08-13-H (2)	Manual on Potato cultivation Manual on insect and diseases of Potato Manual on Potato cultivation Manual on insect and diseases of Potato	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
		FM-09-14-E (1) FM-09-14-E (2) FM-09-14-H (1) FM-09-14-H (2)	Manual on Peas cultivation Manual on insect and diseases of Peas Manual on Peas cultivation Manual on insect and diseases of Peas	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
FM-09	Technical Manual on cultivation techniques for rabi cereals	FM-09-01-E (1) FM-09-01-E (2) FM-09-01-H (1) FM-09-01-H (2)	Manual on Wheat cultivation Manual on insect and diseases of Wheat Manual on Wheat cultivation Manual on insect and diseases of Wheat	JICA TCP JICA TCP JICA TCP JICA TCP	PDF PDF PDF PDF
FM-10	Technical manual on harvest and post harvest of winter vegetables	FM-07-01-E FM-07-01-H	Manual on Post Harvest Techniques Manual on Post Harvest Techniques	JICA TCP JICA TCP	PDF PDF
FM-11	Technical manual on protected cultivation	FM-11-01-E FM-11-01-H	Manual on pest and diseases control in polyhouse Manual on pest and diseases control in polyhouse	JICA TCP JICA TCP	PDF PDF
		FM-11-02-E FM-11-02-H	Manual of fertigation - cucumber, capsicum and tomato Manual of fertigation - cucumber, capsicum and tomato	JICA TCP JICA TCP	PDF PDF
		FM-11-03-E FM-11-03-H	Manual on use of Plastic mulch Manual on use of Plastic mulch	JICA TCP JICA TCP	PDF PDF
		FM-11-04-E FM-11-04-H	Manual on use of shade net and insect net Manual on use of shade net and insect net	JICA TCP JICA TCP	PDF PDF
FM-12	Technical manual on Integrated Pest and disease	FM-12-01-E FM-12-01-H	Manual on integrated pest management Manual on integrated pest management	JICA TCP JICA TCP	PDF PDF
		FM-12-02-E	Manual on integrated disease	JICA TCP	PDF

	Management (IPM & IDM)	FM-12-02-H	management Manual on integrated disease management	JICA TCP	PDF
FM-13	Technical manual on safe use of agro chemicals	FM-13-01-E FM-13-01-H	Manual on safe use of agro chemicals Manual on safe use of agro chemicals	JICA TCP JICA TCP	PDF PDF
FM-14	Technical manual on organic farming	FM-14-01-E FM-14-01-H	Manual on organic manure preparation Manual on organic manure preparation	JICA TCP JICA TCP	PDF PDF
		FM-14-02-E FM-14-02-H	Manual on liquid organic manures preparation Manual on liquid organic manures preparation	JICA TCP JICA TCP	PDF PDF
		FM-14-03-E FM-14-03-H	Manual on organic pesticides preparation Manual on organic pesticides preparation	JICA TCP JICA TCP	PDF PDF
FM-15	Technical manual on exotic and off-season vegetables	FM-15-01-E	Manual on Asparagus cultivation	JICA TCP	PDF
		FM-15-02-E	Manual on Brussels sprouts cultivation	JICA TCP	PDF
		FM-15-03-E	Manual on Celery cultivation	JICA TCP	PDF
		FM-15-04-E	Manual on Trevise (Red-leaved chicory) cultivation	JICA TCP	PDF
		FM-15-05-E	Manual on Fava beans cultivation	JICA TCP	PDF
		FM-15-06-E (1) FM-15-06-E (2)	Manual on Musk melon cultivation open Manual on Musk melon cultivation Polyhouse	JICA TCP JICA TCP	PDF PDF
		FM-15-07-E	Manual on Snap peas cultivation	JICA TCP	PDF
		FM-15-08-E	Manual on Swiss chard cultivation	JICA TCP	PDF
		FM-15-09-E	Manual on Chinese cabbage cultivation	JICA TCP	PDF
		FM-15-10-E	Manual on tomato cultivation in polyhouse	JICA TCP	PDF
		FM-15-11-E	Manual on capsicum cultivation in polyhouse	JICA TCP	PDF
		FM-15-12-E	Manual on cucumber cultivation in polyhouse	JICA TCP	PDF
FM-16	Technical manual on promotion of vegetables	FM-16-01-E	Manual on Promotion of vegetables for next generation program	JICA TCP	PDF
FM-17	Technical manual on irrigation methods	FM-17-01-E FM-17-01-H	Manual on methods of irrigation Manual on methods of irrigation	JICA TCP JICA TCP	PDF PDF

2) Training Materials

Code	Subject	Sub -Code	Name	Source	Type
FM-01	Training material on cropping pattern arrangement	FM-01-01-P	Theoretical training on cropping pattern arrangement	JICA TCP	PPT
		FM-01-02-P	Role of Macro and Microelements	KVK Bara	PDF
		FM-01-03-P	Disease management in vegetables	KVK Bara	PDF

		FM-01-04-D	Theoretical training on cropping pattern arrangement	JICA TCP	DVD
FM-02	Training material on farm management	FM-02-01-P	Worksheet for bookkeeping in Hindi	JICA TCP	PDF
		FM-02-02-P	Cost of cultivation for Tomato	JICA TCP	PDF
FM-04	Training material on nursery production & management	FM-04-01-P	Tips for nursery production and management	JICA TCP	PPT
		FM-04-02-P	New techniques for healthy nursery raising	JICA TCP	PPT
		FM-04-03-P	Nursery production	JICA TCP	PPT
FM-05	Training material on cultivation techniques for summer vegetables	FM-05-01-P	Tips and techniques for Summer vegetable cultivation	JICA TCP	PPT
		FM-05-02-P	Kharif season vegetables for extension staffs	JICA TCP	PPT
		FM-05-03-P	Kharif vegetable cultivation	HPAU, Palampur	PDF
		FM-05-04-P	Insect pests in vegetables	HPAU, Palampur	PPT
		FM-05-05-P	Insect pest and diseases of vegetable (Summer Vegs)	JICA TCP	PPT
		FM-05-06-P	Insect pest and diseases management in kharif vegs	JICA TCP	PPT
		FM-05-07-P	Pest and disease control	JICA TCP	PPT
		FM-05-08-D	Training on Kharif season crop cultivation for farmers	JICA TCP	DVD
		FM-05-09-D	Tips and techniques for Summer vegetable cultivation	JICA TCP	DVD
		FM-05-10-D	Training on Kharif season vegetables for extension staffs	JICA TCP	DVD
FM-06	Training material on cultivation techniques for Kharif cereals	FM-06-01-P	Cultivation of Maize	JICA TCP	PPT
		FM-06-02-P	Agro techniques of Paddy crop	HPAU, Palampur	PPT
		FM-06-03-P	Agro techniques of Maize	HPAU, Palampur	PPT
		FM-06-04-P	Balanced fertilizer use	JICA TCP	PPT
		FM-06-05-P	Insect pest in kharif crops	HPAU, Palampur	PPT
		FM-06-06-P	Important Kharif and Rabi pulses	HPAU, Palampur	PPT
		FM-06-07-P	Balanced water use-Irrigation	JICA TCP	PPT
		FM-06-08-P	Integrated Nutrient Management (INM)	HPAU, Palampur	PPT
		FM-06-09-D	Improvement of food grains productivity	JICA TCP	DVD
FM-07	Training material on harvest and post harvest of summer vegetables	FM-07-01-P	Marketing of vegetables	JICA TCP	PPT
		FM-07-02-P	Agricultural marketing	JICA TCP	PPT
		FM-07-03-P	Marketing strategy for safe and quality vegetables	JICA TCP	PPT
		FM-07-04-P	Case study of Lahalri	JICA TCP	PPT
		FM-07-05-P	Marketing strategy of high value vegetables (Mandi)	APMC, Kullu	PPT
		FM-07-06-P	Marketing strategy of high value vegetables (Kangra)	APMC, Kangra	PPT
		FM-07-07-P	Marketing strategy of high value vegetables (Hamirpur)	APMC, Hamirpur	PPT
		FM-07-08-P	Marketing strategy of high value vegetables (Bilaspur)	JICA TCP	PPT

		FM-07-09-P	Marketing strategy of high value vegetables (Una)	APMC, Una	PPT
		FM-07-10-P	Harvest and post harvest techniques for vegetables	JICA TCP	PPT
		FM-07-11-P	Techniques for preservation of vegetable seeds	JICA TCP	PPT
		FM-07-12-D	Agricultural marketing	JICA TCP	DVD
FM-08	Training material on cultivation techniques for winter vegetables	FM-08-01-P	New techniques for cultivation of Winter season crops	JICA TCP	PPT
		FM-08-02-P	Insect pests and disease management in Cole Crops, Root Crops and Leafy vegetables in Hindi (for farmers)	JICA TCP	PPT
		FM-08-03-P	Insect pests and disease management in Cole Crops, Root Crops and Leafy Vegetables (Extension staff)	JICA TCP	PPT
		FM-08-04-D	Training on tips and techniques of Winter vegetable cultivation	JICA TCP	DVD
		FM-08-05-D	Cultivation of Cole crops, Leafy vegetables and Root crops	JICA TCP	DVD
FM-09	Training material on cultivation techniques for Rabi cereals	FM-09-01-P	Cultivation of Wheat	JICA TCP	PPT
		FM-06-04-P	Balanced fertilizer use	JICA TCP	PPT
		FM-06-06-P	Important Kharif and rabi pulses	HPAU, Palampur	PPT
		FM-06-07-P	Balanced water use-irrigation.ppt	JICA TCP	PPT
		FM-06-08-P	Integrated Nutrient Management (INM)	HPAU, Palampur	PPT
		FM-06-09-D	Improvement of food grains productivity	JICA TCP	DVD
		FM-09-09-D	Cultivation of Wheat	JICA TCP	DVD
FM-10	Training material on harvest and post harvest of winter vegetables	FM-07-01-P	Marketing of vegetables	JICA TCP	PPT
		FM-07-02-P	Agricultural marketing	JICA TCP	PPT
		FM-07-03-P	Marketing strategy for safe and quality vegetables	JICA TCP	PPT
		FM-07-04-P	Case study of Lahalri	JICA TCP	PPT
		FM-07-05-P	Marketing strategy of high value vegetables (Mandi)	APMC, Kullu	PPT
		FM-07-06-P	Marketing strategy of high value vegetables (Kangra)	APMC, Kangra	PPT
		FM-07-07-P	Marketing strategy of high value vegetables (Hamirpur)	APMC, Hamirpur	PPT
		FM-07-08-P	Marketing strategy of high value vegetables (Bilaspur)	JICA TCP	PPT
		FM-07-09-P	Marketing strategy of high value vegetables (Una)	APMC, Una	PPT
		FM-07-10-P	Harvest and post harvest techniques for vegetables	JICA TCP	PPT
		FM-07-11-P	Techniques for preservation of vegetable seeds	JICA TCP	PPT
		FM-07-12-D	Agricultural marketing	JICA TCP	DVD
FM-11	Training material on protected cultivation	FM-11-01-P	Polyhouse technology and crop management	JICA TCP	PPT
		FM-11-02-P	Use of mulch in vegetables	JICA TCP	PPT
		FM-11-03-P	Grafting techniques for improvement of vegetable quality	JICA TCP	PPT
		FM-11-04-P	Cutting preparation in Tomato	JICA TCP	PPT
		FM-11-05-P	Basic knowledge and skills for protected cultivation of vegetables	JICA TCP	PPT
		FM-11-06-P	Crop cultivation in 100m^2 polyhouse	JICA TCP	PPT
		FM-11-07-P	Integrated pest and diseases	JICA TCP	PPT

			management in protected cultivation		
		FM-11-08-P	Fertigation	HPAU, Palampur	PPT
		FM-11-09-P	Irrigation	HPAU, Palampur	PPT
		FM-11-10-P	Greenhouse instrumentation	HPAU, Palampur	PPT
		FM-11-11-P	Soil Health and nutritional aspects of protected cultivation	HPAU, Palampur	PPT
		FM-11-12-D	Training on protected cultivation for farmers	JICA TCP	DVD
		FM-11-13-D	Training on protected cultivation for extension staffs	HPAU, Palampur	DVD
		FM-11-14-D	Training on insect pest management	JICA TCP	DVD
		FM-11-15-D	Training on protected cultivation and post-harvest activities for extension staffs	JICA TCP	DVD
		FM-11-16-D	Training on basic knowledge and skills for protected cultivation of vegetables	JICA TCP	DVD
FM-12	Training material on Integrated Pest and Disease Management (IPM & IDM)	FM-12-01-P	Integrated Disease Management	HPAU	PPT
		FM-12-02-P	Integrated Pest and Disease Management in protected cultivation	JICA TCP	PPT
		FM-12-03-P	IPM in protected & management in exotic vegetable crops	JICA TCP	PPT
		FM-12-04-P	Fungicides products approved for disease control	JICA TCP	PDF
		FM-12-05-P	Insecticides products approved for insect control	JICA TCP	PDF
		FM-12-06-P	New insecticides In India for vegetables crops	JICA TCP	PDF
FM-14	Training material on organic farming	FM-14-01-P	Bokashi Preparation	JICA TCP	PPT
		FM-14-02-P	Vermi Compost and vermi wash preparation	JICA TCP	PPT
		FM-14-03-P	Nadep Compost and CPP preparation	JICA TCP	PPT
		FM-14-04-P	Matka Khad preparation	JICA TCP	PPT
		FM-14-05-P	Marketing of organic produce	JICA TCP	PPT
		FM-14-06-P	Organic standards and certification- An Overview	FTF, Palampur	PPT
		FM-14-07-P	NPOP standards	FTF, Palampur	PPT
		FM-14-08-P	ICS Documentation and record keeping	FTF, Palampur	PPT
		FM-14-09-P	Grower group certification	FTF, Palampur	PPT
		FM-14-10-D	Hands-on training on organic manure preparation for farmers	JICA TCP	DVD
		FM-14-11-D	Hands-on training on Bokashi and Compost preparation for farmers	JICA TCP	DVD
		FM-14-12-D	Theoretical training on organic farming for farmers	JICA TCP	DVD
		FM-14-13-D	Theoretical training on organic farming for extension staffs	JICA TCP	DVD
		FM-14-14-D	Training on organic certification for extension staffs	JICA TCP	DVD
FM-15	Training material on exotic and off-season vegetable	FM-15-01-P	Potential and scope of Exotic vegetable cultivation	JICA TCP	PPT
		FM-15-02-P	Vegetable cultivation in Japan	JICA TCP	PPT
		FM-15-03-P	Techniques for Improvement of Off-Season vegetable cultivation	JICA TCP	PPT

	cultivation	FM-15-04-P	Exotic vegetable cultivation	JICA TCP	PPT
		FM-15-05-P	Off-Season vegetable cultivation	JICA TCP	PPT
		FM-15-06-P	Insect-pests and diseases of exotic vegetable crops	JICA TCP	PPT
		FM-15-07-P	Insect-pests and disease management in exotic vegetables (Mandi)	JICA TCP	PPT
		FM-15-08-P	Cultivation of exotic vegetables in Kangra	JICA TCP	PPT
		FM-15-09-P	Cultivation of exotic vegetables in Mandi	JICA TCP	PPT
		FM-15-10-P	Off-Season vegetable cultivation in Kangra	JICA TCP	PPT
		FM-15-11-P	Off-Season vegetable cultivation in Mandi	JICA TCP	PPT
		FM-15-12-P	Multiplication techniques of exotic vegetables crops	JICA TCP	PPT
		FM-15-13-P	Multiplication of exotic vegetables through grafting	JICA TCP	PPT
		FM-15-14-P	Marketing strategy and quality parameters	JICA TCP	PPT
		FM-15-15-P	Introduction of present scenario of exotic and off season vegetable cultivation	JICA TCP	PPT
		FM-15-16-P	Techniques for improvement of off-season vegetable cultivation	JICA TCP	PPT
		FM-15-17-D	Training on exotic and off season vegetable cultivation	JICA TCP	DVD
		FM-15-18-D	Training on potential and scope of exotic vegetable cultivation (Mandi Kangra & Hamirpur)	JICA TCP	DVD
FM-16	Training material on promotion of vegetables	FM-16-01-P	Discussion on use of guidelines for crop diversification in HP (including cultivation manuals)	JICA TCP	PPT
		FM-16-02-P	How to combat with diabetes	JICA TCP	PPT
		FM-16-03-P	How to control high blood pressure	JICA TCP	PPT
		FM-16-04-P	How to improve anemia	JICA TCP	PPT
		FM-16-05-P	Song for vegetable promotion	JICA TCP	PDF
		FM-16-06-P	Vegetable recipes	JICA TCP	PDF
		FM-16-07-P(1)	Implementation schedule of crop diversification plan in Kangra, Hamirpur and Mandi district	JICA TCP	PPT
		FM-16-07-P(2)	Sample of Format for implementation of cropping schedule	JICA TCP	PDF
		FM-16-07-P(3)	Format for implementation of cropping schedule	JICA TCP	PDF
		FM-16-07-P(4)	Crop schedule for Hamirpur	JICA TCP	PDF
		FM-16-08-D	Implementation schedule of crop diversification plan in Kangra, Hamirpur and Mandi district	JICA TCP	DVD
		FM-16-09-D	Workshop on vegetable promotion at KV School	JICA TCP	DVD
		FM-16-10-D	Exposure visit to Una for farmers	JICA TCP	DVD
		FM-16-11-D	Exposure visit to Karnal for extension staffs	JICA TCP	DVD
		FM-16-12-D	Exposure visit to Solan for farmers	JICA TCP	DVD
		FM-16-13-D	Exposure visit to PAU Ludhiana for extension staffs	JICA TCP	DVD

PART II-5 GENDER

1. Materials to be used in trainings and in field support

Code	Subject	Sub -Code	Name	Source	Type
GD-01	Training Module for SHG Development and support with Supplemental Documents (PPT for SHG, Teaching materials, Handouts for the SHG members)	GD-01-01	TRAINING MODULE (English) SHG Development and Support Version 5 Section 1: Introduction to SHG Support Section 2:Orientation Workshop for SHG Section 3:Training on Credit Management (Inter-loaning) Section 4:Training on Accounting and Book Keeping Section 5:Training on Group Management Section 6:Training on Post Harvest, Processing and other Income Generation Activities Section 7:Training on Value Addition Section 8:Training on Budgeting and Financial Management Section 9:Training on Promotion and Management of Business Micro-enterprise Section 10:Training of Community Motivators on Promotion and Strengthening of SHG Section 11:Training of Community Motivator on Facilitation for Business Promotion of SHG Section 12:Follow-up and Monitoring	JICA TCP	Booklet
		GD-01-02	Appendix 1: Sample form of SHG by-law (Hindi)	JICA TCP	Handout
		GD-01-03	Appendix 2: Responsibility of members and regular meeting (Hindi)	JICA TCP	PPT, Handout
		GD-01-04	Appendix 3: Inter-loaning record (Hindi)	JICA TCP	PPT, Handout
		GD-01-05	Appendix 4: Cashbook Keeping (Hindi/English)	JICA TCP	PPT, Handout
		GD-01-06	Appendix 5: Conflict Management in a Group (Hindi/English)	JICA TCP	PPT, Handout
		GD-01-07	Appendix 6: SHG Leadership Training (Hindi/English)	JICA TCP	PPT, Handout
		GD-01-08	Appendix 7: Training in Pest Control Measures for Nursery Cultivation (Hindi/English)	JICA TCP	Handout
		GD-01-09	Appendix 8: Balanced Diet and Nutrition (Hindi)	JICA TCP	PPT, Handout
		GD-01-10	Appendix 9: Bari (Nugget) and Papad Making Training (Hindi/English)	JICA TCP	Handout
		GD-01-11	Appendix 10: Food Processing (Hindi/English)	Dr.Ranjana Verma	Booklet
		GD-01-12	Appendix 11: Food Poisoning and Its Prevention (Reference in English)	Practical Action	Handout
		GD-01-13	Appendix 12: Making Safe Food (Reference in English)	Practical Action	Handout
		GD-01-14	Appendix 13: Mulberry Leaves (Hindi/English)	JICA TCP	PPT, Handout
		GD-01-15	Appendix 14: Mulberry Processing (Hindi/English)	JICA TCP	PPT, Handout
		GD-01-16	Appendix 15: Budgeting and Pricing (Hindi)	JICA TCP	PPT, Handout

Code	Subject	Sub -Code	Name	Source	Type
		GD-01-17	Appendix 16: Business Plan and Marketing for SHG (Hindi)	JICA TCP	PPT, Handout
		GD-01-18	Appendix 17: Sample Business Plan (Hindi) 01: Food Processing 02: Nursery Preparation 03: SHG Activities	JICA TCP	Handout
		GD-01-19	Appendix 18: Inter-loaning record keeping teaching kits (Hindi)	JICA TCP	Banner & teaching materials
		GD-01-20	Appendix 19: Cashbook keeping teaching kits (Hindi)	JICA TCP	Banner & teaching materials
		GD-01-21	Appendix 20: Success story of SHG (Hindi) (Audio video material)	JICA TCP	Audio video
GD-02	Community Motivators	GD-02-01	Handbook for Community Motivator (Hindi/English)	JICA TCP	Booklet

2. Materials as references for basic knowledge and further understanding

Code	Subject	Sub -Code	Name	Source	Type
GD-03	Reference for trainings on SHG Developme nt	GD-03-01	Experiences sharing on Institutional Development (Collective work management for Farmers' groups / SHG)	JICA TCP	PDF (PPT)
		GD-03-02	Support on SHG Development		PDF (PPT)
		GD-03-03	SHG Development and Support (Planning and practice on the stage of SHG formation)		PDF (PPT)
		GD-03-04	Self Help Groups Formation	Dr. Pradeep	PDF (PPT)
		GD-03-05	Introduction of Organization of Food processing trainings	JICA TCP	PDF (PPT)
		GD-03-06a	Nutrition and Processing	Dr Yogita Sharma	PDF (PPT)
		GD-03-06b	Processing Skills and Packaging	Dr Yogita Sharma	PDF (PPT)
		GD-03-07	Budgeting and Costing	JICA TCP	PDF (PPT)
		GD-03-08	Pricing		PDF (PPT)
		GD-03-09	General Concept of Microenterprise Development	JICA TCP	PDF (PPT)
		GD-03-10	Starting IGA (Income Generating Activities) and Business		PDF (PPT)
		GD-03-11	Marketing Strategy for Women Entrepreneurs		PDF (PPT)
		GD-03-12	Application of Business Management in SHG Development		PDF (PPT)
		GD-03-13	Experience of SHGs in Lahalri 1) Discussion with SHG Bhore Shankar 2) Discussion with SHG Naman 3) Discussion with SHG Shiv Shakti		PDF (PPT)
GD-04	Reference for trainings on Community Motivators	GD-04-01	Workshop on Roles and Works of the Community Motivator	JICA TCP	PDF (PPT)
		GD-04-02	Community Motivator – Role in Enhancing Agriculture Production	Dr.DD Sharma	PDF (PPT)
		GD-04-03	Roles of Community Motivators in SHG support activities	JICA TCP	PDF (PPT)

GD-05	Reference on Gender and Social	GD-05-01	Gender consideration in project implementation	JICA TCP	PDF (PPT)
		GD-05-02	Overview of Gender-Responsive PCM	JICA	PDF (PPT)
		GD-05-03	Gender in Agriculture Extension Service	JICA	PDF (PPT)
GD-06	Reference materials from outside sources	GD-06-01	Training Manual on Self-Help Groups for Micro-Enterprise Development (Training Manual on Self-Help Groups for Micro-Enterprise Development/ Haryana Forest Department (http://hcfp.gov.in/downloads/manuals/Training_Manual_on_SHG_For_Micro-Enterprise_Development.pdf)	Haryana Forest Department	PDF (booklet)
		GD-06-02	A Handbook on Forming Self-Help Groups (SHGs) (http://www.ruralfinance.org/fileadmin/templates/rflc/documents/1100879155210_formingshgs.pdf)	NBARD	PDF (booklet)
		GD-06-03	'GET Ahead for Women in Enterprise Training Package and Resource Kit', ILO Sub-regional Office for East Asia, Bangkok, Job Creation & Enterprise Development Department, (2008)	ILO	PDF (booklet)
		GD-06-04	Business Group Formation – Trainer's Manual	ILO	PDF (booklet)
		GD-06-05	Gender in Agriculture – Sourcebook	FAO	PDF (booklet)
GD-07	Next Generation programme	GD-07-01	Next Generation Activities for HPCDP (Options for possible activities)	JICA TCP	PPT / PDF

PART II-6 MARKETING

Code	Subject	Sub Code	Name	Source	Type
AM-01	Introduction to Agricultural Marketing	AM-01-01	Agricultural Marketing Workshop (In Hindi)	JICA TCP	PPT
		AM-01-02	Agricultural Marketing Workshop	JICA TCP	PPT
		AM-01-03	Training on post-harvest handling and marketing of Cauliflower (In Hindi)	JICA TCP	Handout
		AM-01-04	Market led Extension	JICA TCP	PPT
		AM-01-05	Group Exercise - Marketing of Vegetables	JICA TCP	PPT
		AM-01-06	Agricultural Marketing	JICA TCP	PPT
AM-02	Basic Knowledge for Agricultural Marketing	AM-02-01	Packaging and Grading Processes in Vegetables	JICA TCP	PPT
		AM-02-02	Grading and Packaging Processes in Vegetable Crops	HPSAMB	PPT
		AM-02-03	Market Intelligence and Market Information System	DoA, Hamirpur	PPT
AM-03	Better Price of Product	AM-03-01	Quality Control and Food Safety in Vegetables	JICA TCP	PPT
		AM-03-02	An Appraisal of Food Laws – FSSA 2006	DoH	PPT
AM-04	Marketing for Advance Farmers	AM-04-01	Organic Agriculture Certification and Internal Control System for Smallholder Group Certification	HIMOARD	PPT
		AM-04-02	Organic Agriculture – Market and Trends	HIMOARD	PPT
		AM-04-03	Marketing of Organic Produce	JICA TCP	PPT
		AM-04-04	Post harvest Management and Value Addition in Fruits and Vegetables.	DoA	PPT
		AM-04-05	Legal Framework for Agricultural Marketing including APMC Act.	HPSAMB	PPT
		AM-04-06	Marketing of Organic Vegetables from Himachal Pradesh	JICA TCP	word
AM-05	Other References	AM-05-1	The Himachal Pradesh Agricultural and Horticulture Produce Marketing (Development and Regulation) Act, 2005	DoH, Himachal Pradesh	PDF (Handout)
		AM-05-2	Difference due to quality	JICA TCP	PDF (word)
		AM-05-3	Exotic Vegetables in Retailers	JICA TCP	PDF (word)
		AM-05-4	Various Packages for Vegetables (sample)	JICA TCP	PDF (word)
		AM-05-5	Vegetables in Japan	JICA TCP	PDF (word)
		AM-05-6	Packaging for Vegetables and Fruits in Japan	JICA TCP	PDF (word)
		AM-05-7	Direct marketing	JICA TCP	PPT
		AM-05-8	Marketing and Processing hpmc	JICA TCP	PDF
		AM-05-9	Packaging for fruits in HP	JICA TCP	PPT
		AM-05-10	Brochure for State Agriculture Marketing Board, Rajastan	State Agriculture Marketing Board, Rajastan	PDF
		AM-05-11	Schemes on Promotion of Agricultural Trade and Marketing, State Agriculture Marketing Board, Rajastan (Hindi)		PDF
		AM-05-12	Facilities for Farmers managed by DoH,		PDF

			State Agriculture Marketing Board, Rajastan (Hindi)		
		AM-05-13	Handbook for Agriculture Marketing English version for extension officers Hindi version for farmers		word
AM-06	Crop Budgets	AM-06-1	Crop Budgets Rabi 2012/13 Cauliflower (Proposed) Cauliflower (Actual) Capsicum (Polyhouse) (Proposed) Cucumber (Polyhouse) (Proposed) Pea (Proposed) Potato (Proposed) Radish (Proposed) Radish (Actual) Kharif 2013 Tomato (Actual) Cucumber (Actual) Rabi 2013/14 Cauliflower (Actual) Spinach (Actual) Fennel (Actual) Potato (Actual) Coriander (Actual) Fenugreek (Actual) Turnip (Actual) Radish (Actual) Broccoli (Actual) Cauliflower (Contract Farmer) (Actual) Kharif 2014 Long Yard Beans (Actuals) Snake Gourd (Actual) Sponge Gourd (Actual) Ginger (Actual) Pumpkin (Actual)	JICA TCP	Excel
AM-07	Current Situation of APMU in 5 Districts	AM-07-1	Distribution Channel of Vegetables Bilaspur District Hamirpur District Kangra District Mandi District Una District	JICA TCP	Excel
		AM-07-2	Proportion of Arrival Quantity of Major Vegetables by Source Bilaspur District Hamirpur District Kangra District Mandi District Una District		
AM-08	Monthly Average Wholesale Prices	AM-08-01	Monthly Average Wholesale Prices by APMCs 1. Cabbage : January 2009 to June 2015 2. Capsicum : January 2009 to June 2015 3.Cauliflower: January 2009 to June 2015 4. Peas : January 2009 to June 2015 5. Potato: January 2009 to June 2015 6. Tomato: January 2009 to June 2015	JICA TCP (AGMARK NET)	Excel

			7. Cucumber: January 2009 to June 2015 8. Radish: January 2010 to June 2015 9. Onion : January 2010 to June 2015 10.Spinach: January 2010 to December 2011 11.Brinjal: January 2010 to June 2015 12.Green Chili: January 2010 to December 2011 13.Pumpkin: January 2010 to December 2014 14. Colocasia : January 2010 to December 2011 15. Beans: January 2012 to June 2015 16.Okra: January 2012 to June 2015 17.Bottle Gourd: January 2013 to December 2014 18.Bitter Gourd: January 2013 to December 2014 19.Ginger: January 2013 to June 2015 20.Coriander: January 2013 to December 2014 21.Garlic: January 2012 to June 2015		
	Weekly Average Wholesale Prices	AM-08-02	Weekly Price Information of Strategic Vegetable Crops 1. Cabbage: January 2013 to December 2014 2. Capsicum: January 2013 to December 2014 3.Cauliflower: January 2013 to December 2014 4. Peas: January 2013 to December 2014 5. Potato: January 2013 to December 2014 6. Tomato: January 2013 to December 2014 7. Cucumber: January 2013 to December 2014 8. French Beans: January 2013 to December 2014 9.Brinjal: January 2013 to December 2014 10.Okra: January 2014 to December 2014 11.Bottle Gourd: January 2014 to December 2014 12.Bitter Gourd: January 2014 to December 2014	JICA TCP (AGMARK NET)	Excel
	Daily Minimum – Maximum Prices	AM-08-03	Daily Wholesale Prices of Major Vegetables at APMC Hamirpur 1. Cauliflower: November 2013 to December 2014 2. Cucumber: November 2013 to December 2014 3. Tomato: November 2013 to December 2014 4. Brinjal: November 2013 to December 2014 5. Okra: November 2013 to December 2014	JICA TCP (AGMARK NET)	Excel

			6. French Beans: November 2013 to December 2014		
	Delhi, Chandigarh, Punjab and Haryana Monthly Average Wholesale Prices	AM-08-04	Monthly Average Wholesale Prices by APMCs 1. Tomato : January 2012 to June 2015 2. Onion: January 2012 to June 2015 3. Cauliflower: January 2012 to June 2015 4. Peas : January 2012 to June 2015 5. Cabbage: January 2012 to June 2015 6. Beans: January 2012 to June 2015 7. Potato: January 2012 to June 2015 8. Garlic: January 2012 to June 2015 9. Capsicum : January 2012 to June 2015 10.Radish: January 2012 to June 2015 11.Brinjal: January 2012 to June 2015 12.Cucumber: January 2012 to June 2015 13.Okra: January 2012 to June 2015	JICA TCP (AGMARK NET)	Excel

ANNEXURE 3

VALUE ADDED SUBJECTS

ANNEXURE 3 Value-Added Subjects (1/26)

Concept, information or technique : *Annual Extension training plan.*

Back Ground /Current situation	- DoA used to provide trainings to the Core Extension Officers depending upon the provisions available for capacity building training and no consideration is there about the training needs assessment. -There is every chance that needy CEOs may not receive the training but others may receive more than one time. -The CEOs are not asked to identify the constraints experienced by them in the implementation of different activities under a schemes and possible countermeasures they think.
Objectives	-To assess the Needs and requirements of CEOs and provide capacity building trainings on specific subjects of their interest.
Key words :	Guidelines, Core Extension officer
Contents of introduced concept /information/ technique :	In order to promote crop diversification and for capacity development of CEOs the training needs assessment is done. After prioritization of the needs, annual training schedule is prepared . (Guidelines for Extension Officers for crop diversification).

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ANNEXURE 3 Value-Added Subjects (2/26)

Concept, information or technique : ***Crop diversification plan.***

Back Ground /Current situation		- DoA used to provide irrigation facilities in selected area under different schemes to enhance production of different crops grown in the area. The Extension Officers used to prepare cropping plan (before the project and after the project) to calculate the benefit –cost ratio. No year wise target is fixed for area to be brought under vegetable cultivation depending upon the interest and capacity of the farmers. No season wise monitoring of the area diversified and total production of the crops grown is being practiced to record the changes occurred during subsequent years.
Objectives		-To prepare season and crop wise crop diversification plan of each sub project.
Key words	:	Crop diversification plan ,Guidelines
Contents of introduced concept /information/ technique	:	After having information about the existing cropping system , the importance of vegetable cultivation is discussed with the beneficiaries and their interest to bring crop wise and season wise area is recorded. Year wise increment is also made to achieve the targets. (Guidelines for Extension Officers for crop diversification).

ANNEXURE 3 Value-Added Subjects (3/26)

Concept, information or technique : ***Use of PDCA Cycle***

Back Ground /Current situation		- DoA is executing a number of plans for the welfare of farming community under a set of defined instruction given in the instruction box. The executing agency implement the plan as per instructions given by the higher office and no procedure is followed to ensure the involvement of all the stake holders and review the progress /problems at different stages of execution. No parameters are designed for monitoring and review the progress. For impact analysis no indicators are fixed and thus success or failure of the interventions could not be measured.
Objectives		-To make use of Plan–Do-Check–Act (PDCA) cycle of management in the implementation of different activities of HP Crop diversification promotion project so that the activities could be implemented with in a framed structure and if the model is successful, the same could be replicated in other sub projects. This model provides scope for continuous improvement and thus chances of achieving the targets are very high..
Key words	:	Plan,do,check & act, Monitoring & evaluation.
Contents of introduced concept /information/ technique	:	By making use of PDCA , the PMU and CEOs will be able to plan and execute different components and activities specified for the promotion of crop diversification within the limited project period. On the basis of specific needs of a particular sub project area priorities could be modified. (Guidelines for Extension Officers for crop diversification).

ANNEXURE 3 Value-Added Subjects (4/26)

Concept, information or technique	:	***Fixation of Water Tariff and Record Keepings***
Background/Current situation	:	● DoA has supported Water Users' Association (WUA) using "Guidelines for the implementation of irrigation schemes through water users' association in Himachal Pradesh" since before. ● But the contents put the priority on establishment of WUA and participation in construction of irrigation facilities. ● Therefore WUAs or Extension Officers (EOs) couldn't get enough knowledge on 1) how to set up water tariff and 2) how to record activities of WUA. ● As a result, improper management of association can be observed in existing irrigation projects.
Objectives	:	➢ To provide clear methods to fix water tariff ➢ To show detailed information for record keepings of various activities of WUA
Key words	:	Water tariff, Record keeping of WUA
Contents of introduced concept/information/ technique	:	Guidelines describing 1) methods to fix water tariff and 2) methods to keep various records have been prepared in both English and Hindi (Guidelines on water management by water users' association).

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value-Added Subjects (5/26)

Concept, information or technique	:	***Monitoring Method to Secure the Sustainability of Irrigation Projects***
Background/Current situation	:	● DoA hasn't monitored state of irrigation projects quantitatively after completion of irrigation facilities. ● Therefore determining the existing state depends on impression of an Extension Officer (EO) who is in charge.
Objectives	:	➢ To provide the method of monitoring irrigation projects for securing their sustainability
Key words	:	Monitoring, Sustainability of irrigation projects
Contents of introduced concept/information/ technique	:	Guidelines describing 1) monitoring sheet for securing the sustainability of irrigation project and 2) its managing method have been prepared in both English and Hindi (Guidelines on water management by water users' association).

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value-Added Subjects (6/26)

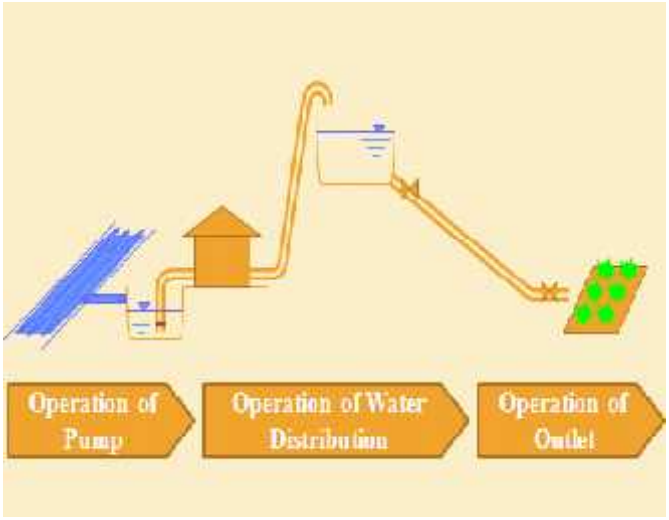
Concept, information or technique	:	***Method of Irrigation Water Use***
Background/Current situation	:	● In irrigation projects implemented in Himachal Pradesh since before, there are 2 methods of water distribution which have been adopted. ● One is a pre-planned method generally adopted in large irrigation scheme. Another is a request-based method generally adopted in small irrigation scheme. ● However, the request-based method has element of "first-come first-served bases". Therefore, it tends to cause confusion or water disputes in the dry season or the time of strong water demand.
Objectives	:	➢ To provide information on proper method of irrigation water use
Key words	:	Water distribution, Irrigation
Contents of introduced concept/information/ technique	:	● New water distribution method which contains block rotation in pre-planned method based on request based method was proposed (Guidelines on water distribution).

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value-Added Subjects (7/26)

Concept, information or technique	:	***Operation of Irrigation Facilities***
Background/Current situation	:	● In Himachal Pradesh, knowledge of operation of irrigation facilities (Especially in lift irrigation) is constructed by Engineers through contractors, who are responsible for designing /installation of irrigation facilities/pipelines. ● The Engineers explain the method of operation of the facilities to the Extension Officers and WUA before handing over the facilities to them. ● But the explanation is generally limited to minimum. ● As a result, wrong operation can be repeated and lead to critical damage of the facilities in some cases. ● This kind of problem can be seen in many developing countries and have a negative effect on sustainability of irrigation project.
Objectives	:	➢ To provide information on operation of irrigation facilities
Key words	:	Operation of irrigation facilities, toruble shooting
Contents of introduced concept/information/ technique	:	Guidelines describing precaution of pump operation, trouble shooting to no water lifting, attention to be made in valve and tank operation and others have been prepared in both English and Hind (Guidelines on operation of irrigation facilities).

Methodology/Images/Conceptual diagram of subject



ANNEXURE 3 Value-Added Subjects (8/26)

Concept, information or technique	:	***Maintenance of Irrigation Facilities***
Background/Current situation	:	● In Himachal Pradesh, knowledge of maintenance of irrigation facilities is constructed by Engineers through contractors, who are responsible for designing /installation of irrigation facilities/pipelines. ● The Engineers explain the method of maintenance of the facilities to the Extension Officers and WUA before handing over the facilities to them. ● But the explanation is generally limited to minimum. ● As a result, less maintenance can be seen and lead to faster depreciation of the facilities in some cases. ● This kind of problem can be seen in many developing countries and have a negative effect on sustainability of irrigation project.
Objectives	:	➢ To provide information on maintenance of irrigation facilities
Key words	:	Maintenance, pumping facilities, pipeline
Contents of introduced concept/information/ technique	:	Guidelines describing method of maintenance of main irrigation facilities such as diversion weir, pumping facilities, water storage tank, open channel and pipeline have been prepared in both English and Hindi (Guidelines on maintenance of irrigation facilities).

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value-Added Subjects (9/26)

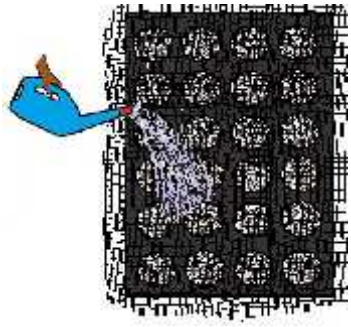
Concept, information or technique	:	***Guidelines for Extension Officers on Water Management and O&M of Irrigation Facilities***
Background/Current situation	:	● DoA has supported establishment of Water Users' Association (WUA) when they construct irrigation facilities. ● But after the completion of the irrigation facilities, supports to WUA were generally few. ● Even when young Extension Officers (EOs) try to support WUA, they need to try and fail because supporting activities to WUA depends on accumulation of experience of each EO. ● As a result, improper management of association can be observed in existing irrigation projects and have a negative effect on sustainability of projects.
Objectives	:	➢ To provide guidelines for extension officers on water management and O&M
Key words	:	Guidelines, Extension officer
Contents of introduced concept/information/ technique	:	Guidelines describing activities needed to strengthen WUAs and detailed contents & procedure of the activities have been prepared (Guidelines for Extension Officers on water management and O&M of irrigation facilities for crop diversification).

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value Added Subjects (10/26)

Concept, information or technique :		***Nursery production***
Background/Current situation	:	Famers in Himachal Pradesh are not familiar with healthy nursery production and only because of that they have unhealthy nursery growth
Objectives	:	➢ To initiate new and improved methods of nursery growing ➢ To promote healthy and disease-free nursery growing techniques ➢ To bring farmer to that level so they can grow their own nursery
Key words	:	Improved, nursery, technique
Contents of introduced concept/information/ technique	:	Use vermiculite, cocopeat and perlite to grow healthy and disease-free nursery in plug trays. Mix these materials thoroughly. Fill the cones up to one-third. Place one seed in each cone and cover it with vermiculite. Then do watering as per need and place it in polyhouse.

Methodology/Images/Conceptual diagram of subject



ANNEXURE 3 Value Added Subjects (11/26)

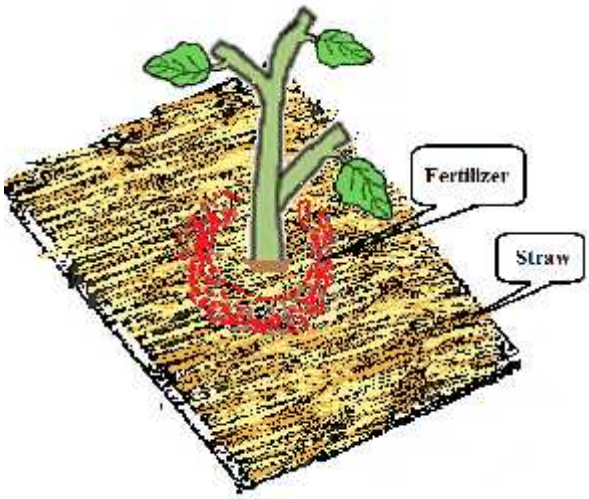
Concept, information or technique	:	***Removal of lower leaves of okra***
Background/Current situation	:	Famers in Himachal Pradesh are not familiar with this technology and inturns they get less harvest
Objectives	:	➢ To reduce the overgrowth of leaves ➢ To promote good aeration among plants ➢ To improve nutrition among plants and make harvesting easy
Key words	:	Areation, nutrition
Contents of introduced concept/information/ technique	:	Soft and tender fruits should be harvested. Frequent pickings are necessary for getting better quality and handsome price. Fruiting is nutrition-consuming stage so that every leaf attached with okra should be removed after harvesting. If lower leave retained, nutrition would be used by lower leaves. In addition, it promotes aeration and reduces disease incidence and ultimately makes harvesting easier. However during initial stage of fruiting, the number of leaves should be more than ten since photosinthesis needs sufficient number of leaves.

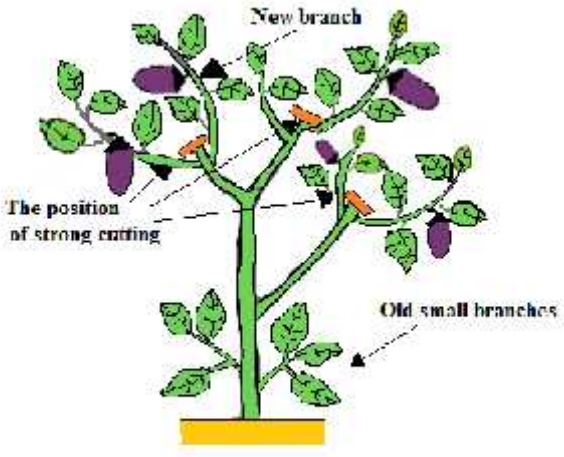
Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value Added Subjects (12/26)

Concept, information or technique	:	***Rejuvenation pruning***
Background/Current situation	:	Famers in Himachal Pradesh are not aware about the technical details of rejuvenation pruning in capsicum and brinjal and therefore suffer from less fruiting during summer.
Objectives	:	➢ To reduce the overgrowth of stems ➢ To keep plants free from insect attack ➢ To improve nutrition among plants
Key words	:	Rejuvenation, stem, nutrition
Contents of introduced concept/information/ technique	:	In the end of July, sometimes yield decreased or bad fruits are observed. It is the time to prune back strongly. ◆ Procedure: Only leave main trunks and lower short branches. ◆ Cut the root of brinjal trees by scoop or stick. ◆ After the strong pruning and root cutting, give enough water and additional fertilizer, then cover the soil surface with straw if it is dry.

Methodology/Images/Conceptual diagram of subject





ANNEXURE 3 Value Added Subjects (13/26)

Concept, information or technique :	***Use of cutting for multiplication of vegetables***	
Background/Current situation	:	Famers in Himachal Pradesh are suffering from scarcity of good seed and its high rate.
Objectives	:	➢ To provide easy multiplication techniques ➢ To keep genetic purity ➢ To minimize seed cost
Key words	:	Cutting, vegetative multiplication

Contents of introduced concept/information/technique : Cutting

- Vegetative multiplication (vegetative propagation, vegetative cloning) is a technique of asexual reproduction in plants. This is an agricultural and horticultural method to multiply plant by inserting a part of the stem of mother plant (called cutting) to media, to expect the formation of adventitious shoots and roots.
- For many of the plants grown as food crops and garden plants, it is hard to inherit their useful trait (genetic characteristic) by seed propagation so that it is desirable to create a clone by vegetative propagation. In addition, growth from seed requires longer time than vegetative propagation.
- It is also applicable to certain vegetables such as tomato, capsicum, brinjal and cucumber. In some extent, applicable to cabbage family.
- Procedure: Prepare clean coarse sand or soilless media for planting. Cut a side stem or branch of good variety of tomato, capsicum and cucumber. Insert cutting into the media and water every day until new roots are developed from the cut part. It will take for 10 days to 2 weeks (duration depends on the variety). Usually the cutting has to come with one or more leaves. This is because new bud comes out from base of the leaf in many cases. However the leaves attached to the branch should be cut out in half. It is necessary to suppress evaporation since cutting has no roots in initial stage so that water absorption is low.

Methodology/Images/Conceptual diagram of subject



ANNEXURE 3 Value Added Subjects (14/26)

Concept, information or technique	:	***Grafting of vegetables***
Background/Current situation	:	Famers in Himachal Pradesh are suffering from soil derived diseases such as bacterial wilt especially in poly-house.
Objectives	:	➢ To provide disease tolerant seedling ➢ To improve economic value ➢ To minimize seed cost
Key words	:	Rootstock, scion, grafting material

Contents of introduced concept/information/technique :

- It is a horticultural technique whereby tissues from one plant are inserted into those of another so that the two set of vascular tissues may join together.
- The technique is most commonly used in asexual propagation of commercially grown plants for the horticultural and agricultural field.
- In most cases, one plant is selected for it root and this is called the stock or rootstock. The other plant is selected for its stems, leaves, flowers, and fruits are called the scion or cion.
- The scion contains the desired genes to be duplicated in future production by the stock/scion plant.
- The rootstock contains the desired genes tolerant to soil derived disease and pests. Wild plants (wild ancestors) are chosen as a rootstock. In Japan, specific seeds for rootstock are developed.
- This technique is applicable to tomato, capsicum, brinjal, melon, water melon and cucumber.
- Ex. "Rootstock :*Solanum torvam variegate*" + "Scion: Hybrid brinjal" to improve disease tolerance

Methodology/Images/Conceptual diagram of subject :Splice grafting

ANNEXURE 3 Value Added Subjects (15/26)

Concept, information or technique	:	***Use of Poly Mulch***
Background/Current situation	:	Poly mulch is a new technique for the famers of Himachal Pradesh and not too many people knew about it.
Objectives	:	➢ To reduce the growth of weeds and to conserve moisture ➢ To keep plants free from insect pests and disease attack ➢ To promote the growth of crops ➢ To make farmers aware and trained about this technique
Key words	:	weed, moisture, technique
Contents of introduced concept/information/ technique	:	Make a straight line by stretching the rope both sides. Make a line digging with triangular hoe. Dig the soil with scoop along with the line made by triangular hoe and put the soil on the bed. Level the top soil of bed by rake or board. Dig a ditch by scoop on one edge of the bed in order to bury the edge of mulching sheet. Settle the mulching sheet by covering the soil. Cover the mulching sheet with soil. Stretch the mulching sheet fully and cover the whole bed. Earth up both end of bed

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value Added Subjects (16/26)

Concept, information or technique	:	***Use of Poly cloth for nursery production***
Background/Current situation	:	In winter season, some parts of Himachal Pradesh are frost prone, so to avoid frost to some extent the farmers are not aware about this technique of use the poly cloth
Objectives	:	➢ To make plants healthy to withstand frost conditions ➢ To keep plants free from insect attack
Key words	:	Frost, insect
Contents of introduced concept/information/ technique	:	◆ Procedure: Grow the crops on raised beds. ◆ Put some semi-circular sticks around the beds making a tunnel like structure. ◆ Spread the insect net on this semi-circular structure of sticks. ◆ One side of the insect net should be permanently buried under the soil. The other side of the insect net should also be buried but not permanently. ◆ Increase the height of tunnel as the crop growth takes place.

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value Added Subjects (17/26)

Concept, information or technique	:	***Hands-on training***
Background/Current situation	:	Most of the trainings towards extension staffs and farmers are lecture type or demonstration type one.
Objectives	:	➢ To provide practical and understandable training ➢ To practice how to guide farmers during training as trial and practice ➢ To give the same training to farmers as a hands-on training to farmers.
Key words	:	Demonstration, hands-on,

Contents of introduced concept/information/technique:

- The term, "Hands-on", literally means touch the hand laying on of hands. It is education term for hands-on learning experience. Hands-on training is an experiential approach to trainees. Especially this is effective for new learners. There are 3 steps of hands-on training.
- **Demonstration**: In first step, expert gives demonstration in front of trainee very closely. It offers trainees the chance to see demonstration of techniques and they can learn through direct observation. Expert brings realia(real instruments and ingredients) that are part of the training topic and demonstrate the steps being taught or processes being adopted. Through observation, trainees understand general techniques as knowledge.
- **Hands-on trial**: In second step, trainees try to imitate those techniques of trainer. The expert helps trainees giving hands one by one. Through participation and interactive experience, trainees understand the techniques by using body.
- **Hands-on practice**: In third step, trainer encourages trainees to do it by themselves. Expert observes their activities and gives practical advice orally. Through practical experience and experimentation, trainees master those techniques. In addition it is also meant to receive a take-home gait guidance directly from the expert.

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value Added Subjects (18/26)

Concept, information or technique	:	***On-the-job training***
Background/Current situation	:	Most of extension staffs have no experience of practice to guide farmers
Objectives	:	➢ To provide opportunity to guide farmers as on-the job training ➢ To practice teaching method in the field
Key words	:	On-the-job

Contents of introduced concept/information/technique:

- The on-the-job training (OJT) approach is to be taken to facilitate the technical dissemination among communities since hands-on training could only cover limited number of participants. Through hands-on training, core extension staffs could be experienced and skillful learner. He/She can guide other extension staffs/farmers as a role model (Behavior model).
- OJT involves new trainees watching trainer (in this case, core extension staffs) and mimicking what they do in order to complete the job as an extensionist. New trainees going through OJT learn at their own pace and have plenty opportunities to ask questions while they are supervised. OJT includes apprenticeship and self-directed learning.
- Behavior modeling is a technique in which trainees watch the demeanor of a trainer when handling a difficult situation, and then replicating the behavior. This is an interactive exercise meant to show new trainees how a model trainer acts and behaves in friendly and difficult situations. This makes them more comfortable when facing situations on the job.

There are four (4) steps of approach as follows;

Step 1

- Prepare the trainees and put them at ease
- State the job and find out what the trainees already knows about it
- Stimulate the trainee's interest in learning the job
- Place the trainee in the correct position

Step 2

- Demonstrate the operations
- Tell, show and illustrate one important point at a time
- Stress each key point
- Instruct clearly, completely and patiently, but teach no more than the trainee can master

Step 3

- Try out the trainee's performance
- Have the trainee do the job, and correct errors
- Have the core extension staff explain each key point to you as he or she does the job again
- Make sure the trainee understands, and continue until you are certain of this

Step 4

- Follow up
- Put the trainee on his/her own
- Designate to whom he or she should go for help
- Check frequently and encourage questions
- Taper off extra coaching and reduce follow-up

Methodology/Images/Conceptual diagram of subject



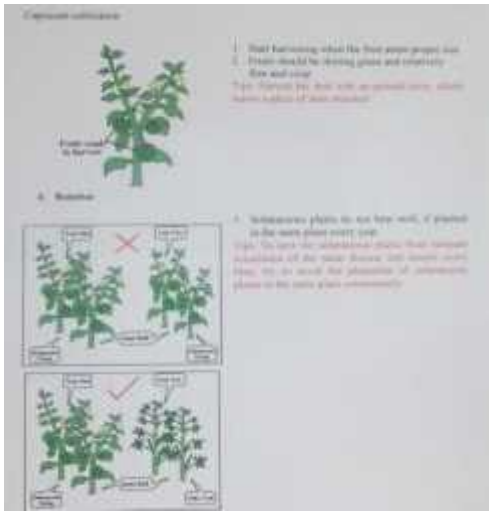

ANNEXURE 3 Value Added Subjects (19/26)

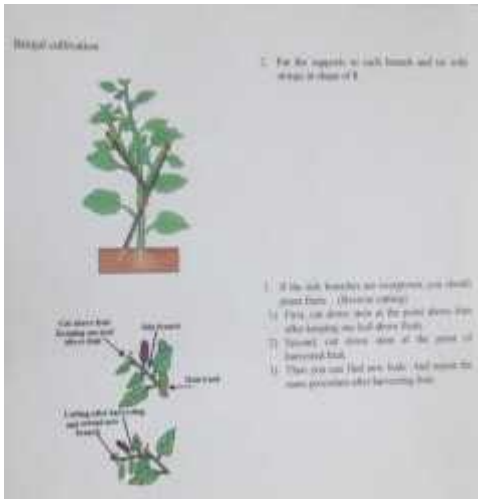
Concept, information or technique	:	***New pictorial manuals with hints and tips***
Background/Current situation	:	Most of manuals do not include so many illustrations and photos.
Objectives	:	➢ To provide understandable manuals ➢ To make manuals more practical ➢ To provide additional information to extension staffs to guide farmers
Key words	:	illustration, photos, hints and tips

Contents of introduced concept/information/technique:

- Technical manual for farming and post harvest comprises with 3 components; "Preparation of Cropping Pattern", "Cultivation Techniques" and "Post-harvest techniques".
- In the part of "Preparation of Cropping Pattern", maps, figures and bar charts are inserted to make it understandable.
- Especially in the part of "Cultivation Techniques", as a visual aide for farmers and extension staffs, so many illustrations and photos are introduced to make manuals understandable.
- Left side of one page is used for illustration section and right side page is used for text of explanation on concerned techniques.
- In right side, hints and tips for cultivation in red letter are inserted for the help of extension staffs so that they can guide farmers properly and easily.
- For detecting insect and disease in the field, photos are provided so as to find countermeasure easily.

Methodology/Images/Conceptual diagram of subject





ANNEXURE 3 Value Added Subjects (20/26)

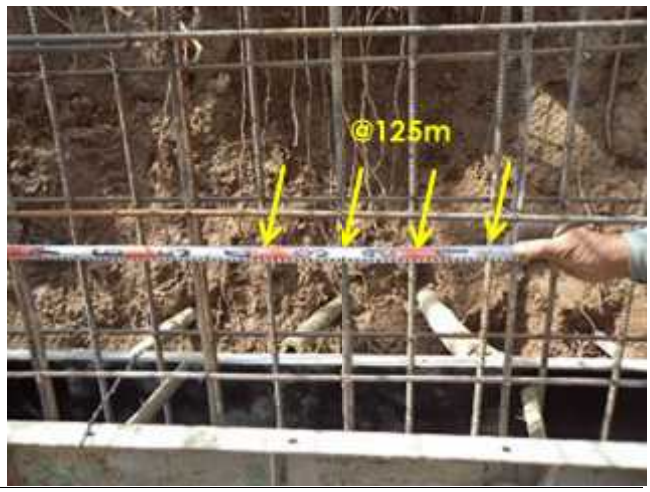
Concept, information or technique	:	***Torrent Intake***
Background/Current situation	:	Previously, we had used the stored water on the upstream side of the concrete weir.
Objectives	:	➢ To the rapid flow change, stable intake ➢ To flow down of rock, sand, wood and garbage etc., stable intake ➢ Maintenance is easy
Key words	:	Torrent, Stable intake, Easy maintenance
Contents of introduced concept/information/ technique	:	This weir is structure that takes water from the downstream side. This weir is structure that stable intake only necessary flow rate. Garbage or Rock flowing from upstream, they are removed by screen that is installed intake parts and they flows to downstream.

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value Added Subjects (21/26)

Concept, information or technique	:	***Progress control, Quality control by photo***
Background/Current situation	:	Previously, we had not left the construction records of irrigation facilities.
Objectives	:	➢ Record of construction progress ➢ Confirmation of materials used ➢ Confirmation of quality control ➢ Material of maintenance ➢ Material of problem-solving ➢ To leave evidence
Key words	:	Recording, progress, quality, control
Contents of introduced concept/information/ technique	:	To show procedure of construction. To show the contents of the location to disappear. exp. Excavation, Pipeline Reinforcement. To confirm the accuracy construction To confirm the materials transported in the site Reference of repair work Clue of solution if there was problem.

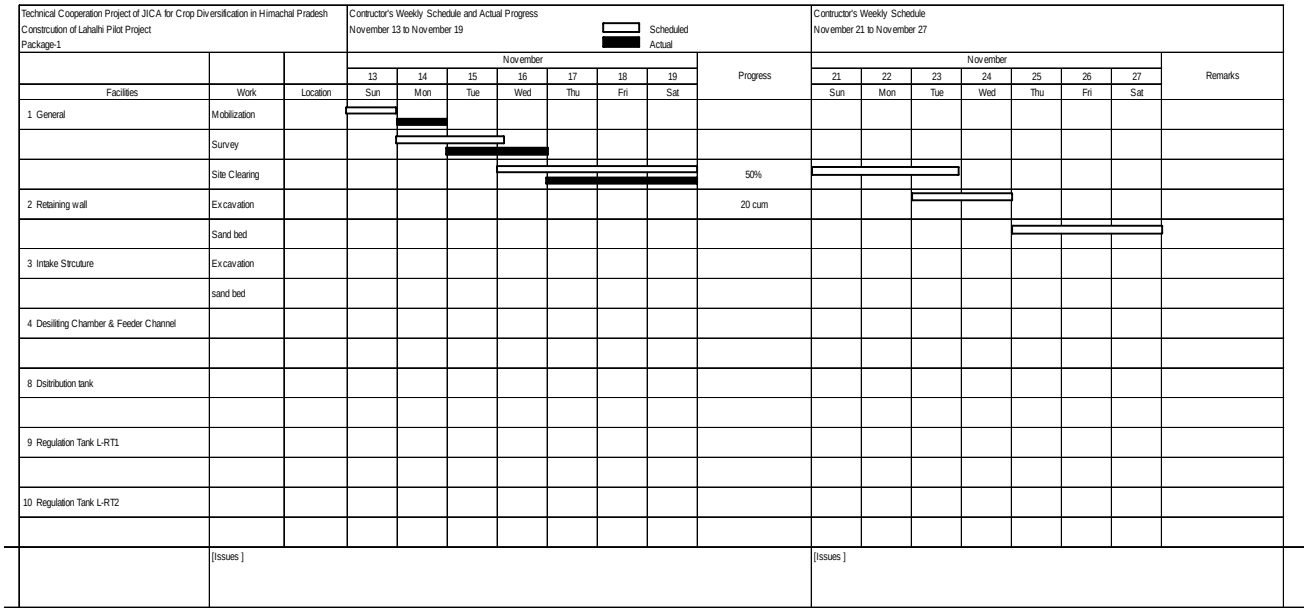
Methodology/Images/Conceptual diagram of subject



ANNEXURE 3 Value Added Subjects (22/26)

Concept, information or technique	:	***Schedule control***
Background/Current situation	:	We have not carried out a process management actively until now.
Objectives	:	➢ To complete construction work within construction period
Key words	:	Schedule, progress, quality, control
Contents of introduced concept/information/ technique	:	This sheet is used meeting time. To confirm next week schedule. To confirm detail working of next week; transport material, equipment preparation etc,.

Methodology/Images/Conceptual diagram of subject



ANNEXURE 3 Value Added Subjects (23/26)

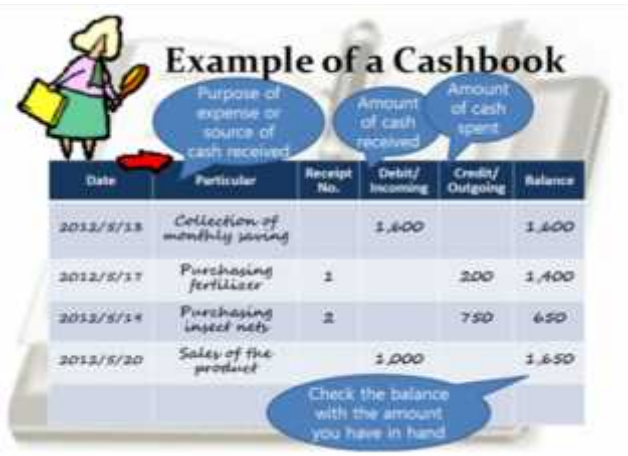
Concept, information or technique	:	***Gender Sensitization of the PMU Officers***
Background/Current situation	:	In Himachal the terminology gender is associated with women only, which is not true as gender distinctions are defined on the basis of socio cultural factors of the society.
Objectives	:	➢ Gender Sensitization of the participants ➢ To distinguish between Sex and Gender ➢ Understanding Gender considerations in JICA Projects
Key words	:	Gender Sensitization and Orientation
Contents of introduced concept/information/ technique	:	➢ Orientation on Gender (PPT) ➢ Gender and Agriculture in JICA projects (PPT and Audio Vedio aids)

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value Added Subjects (24/26)

Concept, information or technique	:	***Reorienting extension approach on SHG training***
Background/Current situation	:	Most of the trainings for extension officers are imparted as lectures with out much consideration of the grasping level of the real stakeholders in the field i.e. SHGs who mostly consist of semi literate members
Objectives	:	➢ Enhancing the capacity of the extension officers to the level where they are confident and trained enough to act as SHG trainers ➢ To design trainings modules in a way which is interesting,simple and directly relates to the present need of the SHGs.
Key words	:	Extension and Training
Contents of introduced concept/information/ techique	:	➢ Designing the trainings through interactive sessions, practice excercies and demo on field sessions. ➢ Use of audio vedio aids to discuss case studies, to ignite interest and for awareness raising. ➢ Use of specially prepared training materials like flexes,banners handouts and manuals (prepared in Hindi) for proper dissemination of information.

Methodology/Images/Conceptual diagram of subject



ANNEXURE 3 Value Added Subjects (25/26)

Concept, information or technique	:	***Mulberry leaf processing technique and benefits***
Background/Current situation	:	Mulberry has been traditionally used as a fodder and the people were not aware about the nutritious properties and the health benefits which could be derieved from mulberry leafs.
Objectives	:	➢ To introduce a processed product from mulberry leaves which is locally available,is unique and has multiple health benefits. ➢ To trigger and enhance interest of SHG members for a group processing activity which is based on locally available raw material and has apotential of generating income for the group.
Key words	:	Mulberry leaf processing
Contents of introduced concept/information/ techique	:	➢ Introduction of benefits of mulberry leaves (hand out and AV aids.) ➢ Technical training on mulberry leaf processing. ➢ Value addition of mulberry flour to processed food products. ➢ Packaging, labeling, pricing and marketing of mulberry leaf tea and other value added processed food products.

Methodology/Images/Conceptual diagram of subject

ANNEXURE 3 Value Added Subjects (26/26)

Concept, information or technique	:	***Handbook of food processing and reference***
Background/Current situation	:	Lack of nutritional information has led to severe nutritional deficiencies in our dietry profile. The booklet is aimed at providing information on various value added recipies alongwith introducing measures related to overcome nutritional deficiencies and market stagnation.
Objectives	:	➢ To introduce nutritious processed food products prepared from locally available raw materials. ➢ To use the booklet as a refrence for dissemination of information on various food processing options. ➢ To promote nutriuton and monetry worth of the home grown vegetables by ways of food processing.
Key words	:	Promotion of Food Processing
Contents of introduced concept/information/ techique	:	➢ Value added pocessed food products ➢ Nutritional aspects of the processed food ➢ Preservation and marketing of processed food products

Methodology/Images/Conceptual diagram of subject