HORTICULTURIST (JOB/TASK ANALYSIS)

Analysis done in preparation of certificate course on Horticulture to be provided at Rural Development Training Centre, Zhemgang

Elaborated by RDTC- Staffs:

Karma Sonam, Director II

Agriculture Sector:

Karma Wangchuk, Instructor, Fruit production
Dorji Tshering, Instructor, Post harvest technologies
Pema Gyeltshen, Instructor, Vegetable Production
Menuka Rai, Farm Economist

Other officials involved during consultative workshop
Tshewang Thinley, Extension Officer, Tingtibi, Zhemgang **(Israel Intern, 2012)**
Yeshi Dorji, Research Officer, RNR-RDC Sub-centre, Tingtibi **(Israel Intern, 2012)**

Acronym

F=Frequency	L=Low	C=Cognitive	C=Class
C=Criticality	M=Medium	P=Psychomotor	L= Laboratory
D=Difficulty	H=High	A=Affective	W= Workshop
			F=Field

Key Job/Tasks for Horticulturist

1. PLANT BOTANY

1.1   Identifying the plant parts and their functions
1.2   Understand plant growth and development

2. VEGETABLE PRODUCTION

2.1   To prepare the field
2.2   To prepare the seeds
2.3   To raise nursery, transplant/intercultural operations
2.4   To water the plants
2.5   To harvest the vegetables
2.6   To control the pests and diseases

3. FRUIT PRODUCTION

3.1   To raise the nursery
3.2   To plan the lay out in the field
3.3   To prepare the field
3.4   To procure the seedlings
3.5   To Plant the seedlings in the field
3.6   To take care of the seedlings
3.7   To train and prune the seedlings
3.8   To apply manure and fertilizers
3.9   To maintain healthy trees
3.10   To harvest the fruits
3.11   To maintain quality of the harvested fruits
3.12   To market the produce

4. **POST HARVEST**
    4.1   Perform and demonstrate post harvest processing of fruits and vegetables
    4.2   Perform and demonstrate storage system
    4.3   Determine the agriculture marketing system

5. **FARM MACHINERY**
    5.1   Operation and maintain farm machineries

6. **BASIC COMPUTER SKILLS**
    6.1   Perform basic computer skills

7. **BASIC FARM ECONOMICS**
    7.1   To analyse farm (economics) profits
    7.2   To maintain the financial records
    7.3   To collaborate with others

8. **SOIL FERTILITY MANAGEMENT**
    8.1   To carry out soil fertility management

DUTY: 1 PLANT BOTANY															
TASK: 1.1 IDENTIFYING THE PLANT PARTS AND THEIR FUNCTIONS									**TASK OBJECTIVE:** RDTC certificate holder will be able to identify the plant parts which include identify the external plant parts, explain the function of plant parts, identify the internal plant parts, identify the life cycle of the crops/plants						
WORK STEP		MEANS (tools, mat.)	F	C	D	SKILL OBJECTIVES		C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
1.1.1	Identify the external plant parts					1.1.1.1	Will be able to identify basic plant parts				Plant parts • Roots, stems, leaves, flowers, flower parts, branches, buds and barks	X			X	PB
						1.1.1.2	Will be able to identify the reproductive parts of flowers					X			X	PB
						1.1.1.3	Will be able to identify and differentiate vegetative					X			X	PB
1.1.2	Explain the function of plant parts					1.1.2.1	Will be able to state and explain the functions of all the external plants parts				Functions • Leaves, stems flowers roots					PB

	WORK STEP	MEANS (tools, mat.)	F	C	D		SKILL OBJECTIVES	C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
1.1.3	Identify the internal plant parts					1.1.3.1	Will be able to observe and identify the internals plant parts of stem, roots, fruits , flowers, and seeds				Parts of stems, roots, flowers, seeds, fruits, and leaves Internal structure of leaves, flowers					PB
1.1.4	Identify the life cycle of plants					1.1.4.1	Will be able to identify and differentiate the life cycle of plants				Life cycle of crops/plants • Annual, biennial, perennial					PB

TASK: 1.2 PLANT GROWTH AND DEVELOPMENT								TASK OBJECTIVE: RDTC Certificate holder will be able to state and explain factors for the plant growth and development which includes; fundamentals of seed germination, fundamentals of photosynthesis, and fundamentals of respiration and transpiration;								
WORK STEP		**MEANS (tools, mat.)**	**F**	**C**	**D**	**SKILL OBJECTIVES**		**C**	**P**	**A**	**INFORMATION ELEMENT OR LEARNING ACTIVITY**	**C**	**L**	**W**	**F**	**SUBJECT**
1.2.1	Explain the fundamentals of seed germination					1.2.1.1	Will be able to explain the conditions required for seeds germination.	X			Seed dormancy • Types Methods of treatment • Stratification, scarification					PB
						1.2.1.2	Will be able to explain what seed dormancy is	X				X	X			PB
							Will be able to identify and select proper methods of seed treatment	X	X				X			

5

1.2.2	Explain the fundamentals of photosynthesis					1.2.2.1	Will be able to explain about photosynthesis	X			Elements of photosynthesis • Carbon dioxides, water, sunlight	X					
						1.2.2.2	Will be able to explain the elements of photosynthesis									PB	
						1.2.2.3	Will be able to state the importance of sunlight, water and carbon dioxide	X					X			PB	
1.2.3	Explain the fundamentals of respiration and transpiration					1.2.3.1	Will be able to explain, 'what respiration and transpiration is?'	X			Respiration and transpiration/ oxidation	X				PB	
						1.2.3.2	Will be able to explain the differences between respiration and transpiration	X									
						1.2.3.3	Will be able to state and explain the importance of respiration and transpiration									PB	

| DUTY/TASK: 2 VEGETABLE | | | | | | | | | | | | | | | | |

| TASK: 2.1. TO PREPARE LAND | TASK OBJECTIVE: RDTC Certificate holder will be able to prepare land as per the crops requirements, identify soil types and suitable crops; the impact of this task in the long run should result in quality seed bed and optimum crop establishment. |

WORK STEP		MEANS (tools, mat..)	F	C	D	SKILL OBJECTIVES		C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
2.1.1	Identify soil type	Spade, soil, auger, Container, scale, soil chart, Forms	L	M	M	2.1.1.1	Will be able to observe soil characteristics and collect sample for lab test	X	X		Soil characteristics • Type, Depth, Texture Sampling • Soil sampling techniques	X	X		X	SS
						2.1.1.2	Will be able to test soil in the field by feel test and read soil charts	X	X		Testing • Feel test of soil Soil charts • Reading and interpreting soil charts Recording and labelling • Methods of recording soil properties • Methods of labelling soil samples	X X X	 X		X X X	ASS ASS ASS
2.1.2	Identify and select suitable site					2.1.2.1	Will be able to identify and select a suitable site for nursery raising and growing vegetables	X			Suitable site for nursery raising • Location, water supply	X			X	CP
2.1.3	Identify suitable crops		L	M	L	2.1.3.1	Will be able to identify suitable crops for a particular area with the knowledge of crop requirement like nutrients, water, soil,	X			Crop characteristics • Growth habit, duration • Root and shoot systems • Crop requirement(nutrient, water, soil temperature, pH, altitude, etc)	X				CP

						temperature, pH, altitudes, etc										
2.1.4	Prepare land	Cultivating tools Spade, hoe, plough, harrow, leveller	L	M	L	2.1.4.1	Will be able to prepare land according to crop requirements		X		Land preparation • Crop requirement(aeration, depth, tilth) • Method of land preparation	X			X	CP
						2.1.4.2	Will be able to select appropriate tools for different land preparation and know how to operate them	X	X		Cultivating tools • Selection of tools for different land preparation	X			X	AEG

8

TASK: 2.2 TO PREPARE SEED							TASK OBJECTIVE: RDTC Certificate holder will be able to prepare seeds which includes determining sowing and planting time; quality of seeds; quantity of seeds required; selecting seeds, preparing seed materials; the impact of this task in the long run should result in optimum utilization of seeds and crop stand.							
WORK STEP		MEANS (tools, mat..)	F	C	D	SKILL OBJECTIVES		C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
2.2.1	Determine the time of sowing and planting	Rain guage, thermometer	L	H	L	2.2.1.1	Will be able to sow/plant the seeds at the right time	X			Cropping systems Agri. Meteorology					CP
						2.2.1.2	Will be able to handle and read thermometer and rain gauge	X								MAS CP
2.2.2	Determine the quality of seed	Blotting paper.towl, water	M	H	M	2.2.2.1	Will be able to assess the quality of seed physically by observing.	X			Seed testing • Take seed samples • Germination test/viability test Seed quality • Purity, health Sampling technique and procedure	X X	X X		X X	PBS PBS
						2.2.2.2	Will be able to take seed sample and conduct germination/viability test	X	X							PBS
2.2.3	Determine the quantity of seed required		M	M	L	2.2.3.1	Will be able to calculate the quantity of seeds required in a given area , given seeds rate/ha	X	X		Seed rate • Spacing recommendations • Crop requirements	X				CP
2.2.4	Select seeds		M	H	L	2.2.4.1	Will be able to identify different crop seeds for given crop, given selection criteria.	X	X		Seed identification • Methods Selection of seeds • Methods, criteria	X	X X			CP PBS

			F	C	D		SKILL OBJECTIVES	C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
2.2.	Prepare seed materials	Chemicals, Containers, winowers, boxes	L	M	M	2.2.5.1	Will be able to clean and treat seed materials without damaging	X	X		Cleaning seeds • Methods of cleaning					
						2.2.6.2	Will be able to prepare seeds for sowing : pre-sowing treatment	X	X		Seed treatment Pre sowing • Methods and conditions • Soaking	X		X		PBS

TASK: 2.3 TO RAISED NURSERY AND TRANSPLANT /INTERCULTURAL OPERATIONS											**TASK OBJECTIVE:** RDTC Certificate holder will be able to carry out sowing and planting, preparing and raising nursery, transplanting, weeding and top dressing and performing horticultural operations; the impact of this task in the long run should result in increasing early establishment percentage of seeds/seedlings and therefore crop stand.					
WORK STEP		**MEANS (tools, mat..)**	**F**	**C**	**D**	**SKILL OBJECTIVES**		**C**	**P**	**A**	**INFORMATION ELEMENT OR LEARNING ACTIVITY**	**C**	**L**	**W**	**F**	**SUBJECT**
2.3.1	Sow or plant	Seed driller, fertilizer, seeds, marker	H	M	M	2.3.1.1	Will be able to sow or plant seeds and seedlings in the field with the given type of crops and seed drills/planting machines		X		Methods of sowing/planting • Line sowing, broadcasting, drilling, dibbling, random planting Seed depth/ spacing	X			X	CP
						2.3.1.2	Will be able to trace the lines in the field with the given marker/ the tracer		X		• Line tracing Fertilizer • Type of Nutrient content • Calculation of fertilizer quantity	X X		X	X X	AEG CP

2.3.2	Prepare and raise nursery	Tools				Code	Performance				Knowledge					Abbr
						2.3.1.3	Will be able to apply FYM/compost and fertilizers in the field given the recommended rate and fertilizers				required Soil conditions • Moisture, temperature, tilth Mulching • Materials, benefits	X			X	M&F CP CP
						2.3.1.4	Will be able to determine the soil condition in the field	X	X							
						2.3.1...	Will be able to carry out mulching/covering of the seeds/seedlings in the field given the mulching materials		X							
2.3.2	Prepare and raise nursery	Spade, polythene, watering can, hoe, rake, ropes, seeds, nursery trays, chemical, spraying equipments	H	H	H	2.3.2.1	Will be able to determine the nursery size and sow seeds given the seed rate to be planted and germination of the seed	X			Nursery size • Seed rate, spacing, area, germination Methods of sowing in nursery • Broadcast, line sowing, seed depth	X X			X	CP CP
						2.3.2.2	Will be able to construct polythene, cover over the nursery given the polythene sheets and bamboo sticks.		X		Green house techniques • Using plastics for nursery, sterilizing soil	X			X	HOR&CP
						2.3.2.3	Will be able to sterilize the nursery given the chemical rate and containers		X		Nursery management • Water • Nutrient • Weeds and pests Nursery techniques	X			X	
						2.3.2.4	Will be able to manage the water and nutrients in the		X		• Tray • Straw thatch	X			X	HOR&CP

11

							nursery				• Poly-tunnel Seedling treatment • Chemicals and preparation, equipment types and time treatment	X			X	
						2.3.2...	Will be able to raise the seedlings in the trays given the trays and the medium		X							
						2.3.2..	Will be able to prepare the chemicals and treat the seeds and seedlings given the chemicals, equipments like dose of chemicals		X							
2.3.3	Transplant	Transplanter, Sticks, ropes, pegs, secateurs, containers, fertilizers, seedlings, crowber, spade, tape	H	H	M	2.3.3.1	Will be able to identify the seedling for transplanting in the field		X		Growth stages of crops	X			X	CP & HOR
						2.3.3.2	Will be able to operate transplanter and transplant the seedlings in the field		X		Transplanter • Operate	X			X	AEG
						2.3.3.3	Will be able to prune the roots of fruit and vegetables in the field given the seedlings		X		Techniques of transplanting Uprooting, handling, planting	X			X	CP&HOR
						2.3.3.4	Will be able to handle/transport seedling from nursery to the field		X		Fertilizer application Types, placement and doses	X			X	M&F
						2.3.3...	Will be able to apply the fertilizers in the field given the recommended dosages, area and the fertilizers		X		Pruning, staking	X			X	HOR

						2.3.3..	Will be able to provide support to the seedlings given the poles in the field				Pit digging • Spacing • size					
2.3.4	Weed and top dress	Fertilizers, weedicides, rake, hoe, weeder, sprayer	M	M	L	2.3.4.1	Will be able to select, handle the intercultural operation tools		X		Intercultural operation tools • Types, uses, maintenance, safety precautions, identification and selection	X		X	X	M&F
						2.3.4.2	Will be able to calculate the fertilizer required given the land area, crop requirement and available fertilizer	X			Fertilizer Types, selection and calculation	X		X		
						2.2.4.3	Will be able to select, calculate the weedicides given the area, types of weeds, rate and types of weedicides				Weedicides Types, selection, calculation	X		X		PP
2.3.	Perform horticultural operation	Secateurs,	L	H	L	2.3.5.1	Will be able to train the vegetable crops				Horticulture techniques • Types methods					HOR
						2.3.6.2	Will be able to prune the vegetable crops	X			Propagation techniques • Tissue culture	X		X		HOR
						2.3.6.3	Will be able to carry out propagation techniques like tissue culture in the lab		X							

TASK: 2.4 TO WATER THE CROPS/PLANTS							TASK OBJECTIVE: RDTC Certificate holder will be able to assess water requirement of crops, selecting methods of irrigation, irrigating, draining field, maintaining water sources and controlling erosion; the impact of this task in the long run should result in improved field condition and increased income of the farmers.								
WORK STEP		**MEANS (tools, mat..)**	**F**	**C**	**D**	**SKILL OBJECTIVES**		**C**	**P**	**A**	**INFORMATION ELEMENT OR LEARNING ACTIVITY**	**C**	**L**	**W**	**F**	**SUBJECT**
2.4.1	Assess water requirement of the crop		M	H	L	2.4.1.1	Will be able to assess time of watering, quantity of water required for different crops	X			Water requirement of crops Time, quantity, duration, frequency, critical stages	X			X	CP &HOR
						2.4.1.2	Will be able to assess the duration & frequency of irrigation & will identify the critical stages of crops									
2.4.2	Select methods of irrigation		L	H	M	2.4.2.1	Will be able to assess the topography of land, soil types and water availability in the locality	X			Survey of land Soil type, topography, water availability	X			X	MAS.
						2.4.2.2	Will be able to select the crop type depending upon the soil type and water availability	X			Methods of irrigation	X			X	CP

14

	WORK STEP	MEANS (tools, mat..)	F	C	D		SKILL OBJECTIVES	C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
2.4.3	Irrigate	Pipes, sprinklers, cans, spade	H	H	H	2.4.3.1	Will be able to select suitable irrigation equipment, handle and operate the equipment	X	X		Irrigation equipment • Types, select, handle, • operate Techniques of irrigation Furrows, basins, drip, sprinkler, channel, terrace management	X		X	X	AEG
						2.4.3.2	Will be able to make furrows & basins		X			X			X	AEG
2.4.4	Drain the field	Pumps, Spade.\, pipes	L	M	H	2.4.4.1	Will be able to assess the excess water and drain out	X			Drainage methods • Open ditch, pump Operation of pumps • Types, installation & operation	X			X X	AEG AEG

TASK: 2. TO HARVEST THE VEGETABLES											TASK OBJECTIVE: RDTC Certificate holder will be able to determine time of harvest and harvesting; the impact of this task in the long run should result in decreased loss of crop yield and increased farmers income.					
WORK STEP		MEANS (tools, mat..)	F	C	D		SKILL OBJECTIVES	C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
2.5.1	Determine the time of harvest	Moisture meter	M	H	M	2.5.1.1	Will be able to determine the time of harvesting by observing and feeling the crop	X			Harvesting stage Crop maturity, crop duration, feeling means				X	CP

15

| 2.5.2 | Harvest the crop | Sickle, hoe, spade, container, harvester | M | M | M | 2.5.2.1 | Will be able to handle the crops properly while harvesting and handling equipments for harvesting is any | | X | | Harvesting
• Stage of crops
• Handling crops
• Handling equipments | X | | | X | CP |

TASK: 2. 6 TO CONTROL PESTS AND DISEASES					**TASK OBJECTIVE:** RDTC Certificate holder will be able to effectively carry out plant protection activities which includes; identifying the problem, the cause of the problem, identifying and selecting the control measures.			

WORK STEP		MEANS (Tools, mat..)	F	C	D	SKILL OBJECTIVES		C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
2.6.1	Identify the problem		H	H	H	2.6.1.1	Will be able to observe the field and plants/plant parts/crop in the field	X			Sampling techniques or procedures • Plant materials • symptoms				X	PP
						2.6.1.2	Will be able to sample quantitatively									

16

							plants in field condition using hand book with procedure								
2.6.2	Identify the cause of the problem	Hand lens, references, knife	H	H	H	2.6.2.1	Will be able to identify the symptoms on crops using hand lens given symptoms chart	X	X		Identification of symptoms Symptom characteristics, environment, stages	X	X		X	PP
						2.6.2.2	Will be able to observe the symptoms carefully to find the cause in the field using hand lens and symptom chart.	X					X		X	PP
						2.6.2.3	\will be able to identify the susceptible stage of the plants									
2.6.3	Take appropriate control measures	Chemicals, pp equipment	H	H	H	2.6.3.1	Will be able to identify the control measures given the handout containing various controls measures for each pests/diseases	X			Control measures • Chemical, cultural, biological, mechanical PP equipment • Handling, operation, types, uses, safety measures Chemicals	X	X		X	PP

							2.6.3.2	Should be able to carry out /apply control measures effectively given recommended time of application, types of chemicals and PP equipments		X		• Formulation, types, dosage, precautions	X	X	X	X	PP
							2.3.3.3	Will be able to handle the PP equipments properly in the field conditions		X			X	X		X	PP
							2.3.3.4	Will be able to carry out cultural/biological control measures in the field conditions		X							
							2.3.3.5	Should be able to prepare chemicals given formulation of chemicals and recommendations		X							

DUTY: 3 Fruit production																
TASK: 3.1 To raise the nursery											**Objective:** The apprentice will be able to determine the suitable site, labour and materials required, procure and collect the materials, make necessary field preparation, and carryout intercultural operations, which includes manure, watering and weeding for the fruit nursery in the field.					
Work steps		MEANS (Tools mat...)	F	C	D		Skill objective	C	P	A	Information element, learning activity	C	W/L	F	MF	Subject
3.1.1	Plan the nursery location		M	M	M	3.1.1.1	Will be able to state the suitable conditions for nursery correctly.			X	• Suitable conditions for nursery • Water availability • Location • Soil conditions	X		X		Farm management
						3.1.1.2	Will be able to determine the nursery size correctly	X		X	• Space requirements of different stages of seedlings • Quantity of seedlings to be produced	X		X		Farm management
3.1.2	Determine labour requirement		M	M	M	3.1.2.1	Will be able to list out the activities to be carried out	X	X		• Different nursery activities	x		x		Farm management
						3.1.2.1	Will be able to allocate time required for each activity	X			• Standard times for different nursery activities			X		Farm management
						3.1.2.2	Will able to estimate the labour requirement correctly	X	X		• Standard times and labour requirements for different nursery activities	X		X		Farm management

							depending on the activity								
3.1.3	Estimate materials requirement		M	M	L	3.1.3.1	Will be able to list the materials require	X		X	• Materials required			X	Farm management
						3.1.3.2	Will be able to find out the quantity of each materials required	X	X		• Applied basic calculation	X		X	Farm economic
						3.1.3.3	To be able to calculate total materials requirement			X	• Applied basic calculation	X		X	Farm economic
	To Procure materials		M	M	M		Will be able to identify source of materials.	X	X		• Sources of materials • Sources of information on suppliers of material			X	Farm management
						3.1.3.4	Will be able to write supply order correctly	X			• Minimum content of supply order • Standard supply order format	X		X	Farm economic
						3.1.3.5	Will be able to verify right quantity & quality of materials.	X		X	• Quality requirements • Specifications of different materials	X		X	Farm management
						3.1.3.6	Will be able to arrange appropriate transport		X		• Different means of transport and their strengths and limitations • Minimum transport requirement of respective material			X	Farm management

3.1.4	To prepare good field/beds		L	M	L	3.1.4.1	Will be able to operate digging tools in right way	X		X	• Functions and use of the different tools • Safety and security aspects			X		Farm machinery
						3.1.4.2	Will be able to assess the structure of the soil in terms of plants needs	X			• Soil (structure, texture, water household, air, temperature) • Feel method • Need of plant	X		X		Soils
						3.1.4.3	Will be able to prepare the correct length, breath & height of the bed			X	• Dimensions of standard nursery bed • Need of plant	X		X		Crop production
	To apply manure & fertilizer		L	L	L	3.1.4.4	Will able to determine type & quantity required depending on soil fertility & plants need			X	• Soil fertility (N, P, K, pH, organic matter) • Types of manure and fertilizers (nutrient content, strengths and limitations) • Plant needs	X		X		Manure & fertilizers
						3.1.4.5	Will be able to prepare fertilizer mixture as per requirement correctly	X		X	• Calculations • Precautions when using mixtures	X		X		Manure & fertilizers
						3.1.4.6	Will be able to choose correct method of application			X	• Precautions	X		X		Manure & fertilizers
3.1.5	To water		M	M	L	3.1.5.1	Will be able to choose correct method of irrigation/ watering			X	• Type of irrigation • Furrow irrigation • Dip irrigation	X		X		Water management

						3.1.5.2	Will be able to water the plants as per soil dryness			X	• Soil condition	X		X	Water management
3.1.6	To weed		M	H	L	3.1.6.1	Will be able to weed the plants depending on the weed pressure			X	• Different weeds	X		X	Plant protection
3.1.7	To apply top dressing		M	M	L	3.1.7.1	Will be able to identify symptoms of the plants	X	X		• Identification of nutrient deficiency symptoms	X		X	Manure & fertilizers
						3.1.7.2	Will be able to indicated fertilizer	X			• Plant symptoms	X		X	Manure& fertilizers
						3.1.7.3	Will be able to prepare fertilizer mixture & method of application			X	• Applied maths and application methods	X		X	Manure & fertilizers

Task: 3.2 To plan the layout in the field								Objective The apprentice will be able to carry-out field layout of different methods for orange plantation in the given site/location in the field.									
Work Steps		MEANS (tools, mat)	F	C	D		Skills objective	C	P	A	Information element, learning activity	C	W/L	F	MF	Subject
3.2.1	To clear the field		M	H	L	3.2.1.1	Will be able to use right tools	• X			• Types of tools used for cutting	X		X		Farm machinery
3.2.2	To do the lay out		L	H	L	3.2.1.1	Will be able to select the appropriate layout for the cultivar	X			• Cultivars of apples, their requirements/characteristics • Layout methods, advantages and disadvantages	X		X		Crop production
						3.2.1.2	Will be able to collect proper materials for carrying out the layout.	X	X		• Materials used for different layout methods	X		X		Crop production
						3.2.1.3	Will be able to hire required numbers of labours.	X			• Organise labourers			X		Farm management

Task: 3.3 To prepare the field								Objective The apprentice will be able to determine the pit size, tools for digging and refill the pits with proper ratio of manure & fertilizers mixed with topsoil in the field.							

Work Steps		MEANS (Tools, mat)	F	C	D		Skills objectives	C	P	A	Information element, learning activity	C	W/L	F	MF	Subject
3.3.1	Digging the pits		M	H	L	3.3.1.1	Will be able to mark radius & size of the pit			X	• Size of the standard pits (radius and depth)	X		X		Crop production
						3,3,1,2	Will be able to dig the right depth			X	• Size of the standard pits (radius and depth) • Tools used for digging	X		X		Crop production
						3.3.1.3	Will be able to choose right tools for digging	X	X		• Tools used for digging		X	X		Farm machinery
						3.3.1.4	Will be able to hire sufficient numbers of labours	X			• Organise labourers			X		Farm management
3.3.2	Filling the pits		M	H	L	3.3.2.1	Will be able to fill pits with alternate layers of top soil & manure			X	• Materials required for pit filling (types and quantity)	X		X		Crop production
						3.3.2.1	Will be able to check whether the pits are fully set	X	X		• Crop requirement of the soil			X		Soils

Task:											Objective					
3.4 To procure seedling											The apprentice will be able to determine the suitable cultivars and the seedling required for given area, identify the supply agents and write supply orders, and identify the means and arrange for transportation.					

Work Steps		MEANS (tools, mat)	F	C	D		Skill Objectives	C	P	A	Information element, learning activity	C	W/L	F	MF	Subject
3.4.1	To define needs		L	M	L	3.4.1.1	Will be able to calculate numbers of seedling needed	X	X		• Plant spacing • Basic calculation	X		X		Farm economic
						3.4.1.2	Will be able to choose suitable cultivar	X	X		• Cultivars of apples, their requirements/characteristics	X		X		Crop production
3.4.2	To identify source of supply		M	M	L	3.4.2.1	Will be able to collect relevant information	X	X		• Sources of information			X		Farm economic
3.4.3	To buy seedling		M	H	M	3.4.3.1	Will be able to write supply order	X			• Basic contents of the supply order	X		X		Farm economic
						3.4.3.2	Will be able to verify right quantity & quality of seedling	X	X		• Cultivars of apples, their requirements/characteristics • Supply order			X		Farm economic
						3.4.3.3	Will be able to arrange appropriate transport	X	X		• Transport requirement of the seedling • Negotiation techniques			X		Farm management

<table>
<tr><td colspan="3">Task: 3.5 Plant seedling in the field</td><td colspan="5"></td><td colspan="8">Objective :The apprentice will be able to carry out planting of seedlings in the field, which be determine such as hole depth for planting, graft union about the ground and labour requirement for given plants/areas.</td></tr>
</table>

	Works Steps	**MEANS (tools, mat)**	**C**	**F**	**D**		**Skill objectives**	**C**	**P**	**A**	**Information element, learning activity**	**C**	**W/L**	**F**	**MF**	**Subject**
3.5.1	To plant		H	M	L	3.5.1.1	Will be able to loose or dig hole for planting	X		X	• Planting techniques	X		X		Crop production
						3.5.1.2	Will be able to lay out roots in the soil			X	• Planting techniques	X		X		Crop production
						3.5.1.3	Will be able to state/know the depth of the plants should be put in the soil from grafted union	X			• Plant requirement	X		X		Crop production
						3.5.1.4	To be able to hire sufficient numbers of labours	X			• Organise labour			X		Farm management

<table>
<tr><td colspan="3">Task:
3.6 To take care of young seedling after planting</td><td colspan="5"></td><td colspan="8">Objective
The apprentice will be able to carryout timely intercultural practices, such as staking the plants, watering, mulching, top dressing etc. in the field.</td></tr>
</table>

	Work Steps	**MEANS (tools, mat)**	**C**	**F**	**D**		**Skill Objectives**	**C**	**P**	**A**	**Information element, learning activity**	**C**	**W/L**	**F**	**MF**	**Subject**
3.6.1	Staking the plants		H	M	L	3.6.1.1	Will be able to collect appropriate staking materials	X			• Uses of stakes, materials that be used to stake			X		Crop production

						3.6.1.2	Will be able to carry out staking in the right way			X	• Staking - methods			X		Crop production
3.6.2	To water		H	H	M	3.6.2.1	Will be able to choose proper irrigation/watering method		X		• Irrigation requirement, irrigation methods (advantages and disadvantages)	X		X		Water management
						3.6.2.2	Will be able to judge the soil dryness and water plants		X		• Soil characteristics (texture, structure, water holding capacity) • Irrigation requirement, methods	X		X		Soils
3.6.3	To mulch		H	H	L	3.6.3.1	Will be able to collect appropriate materials			X	• Mulches (functions, types of materials, methods of mulching)			X		Crop production
						3.6.3.2	Will be able to mulch plants in right way			X	• Mulches (functions, types of materials, methods of mulching)			X		Crop production
3.6.4	Top dress		M	M	L	3.6.4.1	Will be able to identify symptoms of the nutrient deficiency	X	X		• Nutrient requirement, nutrient deficiency symptoms	X				Soil
						3.6.4.2	Will be able to identify fertilizer		X		• Types of fertilizers, nutrient content	X		X		Manure & fertilizers
						3.6.4.3	Will be able to prepare fertilizer mixture & method of application	X		X	• Types of fertilizers, nutrient content, fertilizer requirement of the plant, methods of fertilizer application	X		X		Manure & fertilizers

<table>
<tr><td colspan="2">Task:
3.7 To train & prune the trees</td><td colspan="14">Objective
The apprentice will be able to determine tools for pruning, identify unwanted limbs and stems, and carryout training and pruning of plants in the field.</td></tr>
</table>

Works Steps		MEANS (tools, mat)	F	C	D		Skill objectives	C	P	A	Information element, learning activity	C	W/L	F	MF	Subject
3.7.1	Cut limbs & stems of young plants		M	M	M	3.7.1.1	Will be able to choose the right tools	X			• Pruning tools – types and uses	X	X			Farm machinery
						3.7.1.2	Will be able to cut right limbs & stems	X		X	• Pruning methods • Advantages & disadvantages	X	X			Crop production
3.7.2	To cut limbs, stems of old tree		M	M	M	3.7.2.1	Will be able to choose the right tools	X			• Pruning tools – types and uses			X		Crop production
						3.7.2.2	Will be able to thin out right branches from the trees			X	• Pruning – why, what and when to prune	X				Crop production

Task: 3.8 To apply manure & fertilizer								Objective The apprentice will be able to determine the fertilizer requirement of the plants, calculate the ratio mixture and apply in the field through correct methods of application.						
Works Steps	**MEANS (tools, mat)**	**F**	**C**	**D**		**Skill objectives**	**C**	**P**	**A**	**Information element, learning activity**	**C**	**W/L**	**F**	**MF**	**Subject**
3.8.1 To procure manure & fertilizer		M	M	L	3.8.1.1	Will be able to use right and correct quantity of manure depending on the soil fertility & plants needs.	X		X	• Types of manures, functions of manures, advantages and disadvantages of manures, nutrient content of the manures • Types of fertilizers, nutrient content, fertilizer requirement of the plant, methods of fertilizer application	X X		X		Manure & fertilizers
					3.8.1.2	Will be able to prepare correct fertilizer mixture as per requirements	X		X	• Types of fertilizers, nutrient content, fertilizer requirement of the plant	X		X		Manure & fertilizers
					3.8.1.3	Will be able to choose correct method of application	X	X		• Types of fertilizers, nutrient content, fertilizer requirement of the plant, methods of application	X		X		Manure & fertilizers

Task: 3.9 To maintain healthy trees										Objective The apprentice will be able to determine the major pests and diseases incidents, carryout control measures by the means of bio and chemicals, operate the spraying machines and maintain orchard sanitation.						

Work Steps		MEANS ((tools, mat)	F	C	D		Skill objectives	C	P	A	Information element, learning activity	C	W/L	F	MF	Subject
3.9.1	To control pest		H	H	H	3.9.1.1	Will be able to identify major pest	X	X		• Major pests of apples, identification, nature of damage and time of damage	X		X		Plant protection
						3.9.1.2	Will be able to control major pest, biological & chemical means.	X		X	• Control methods of major apple pests, advantages and disadvantages	X		X		Plant protection
3.9.2	To control disease		H	H	H	3.9.2.1	Will be able to identify major disease	X	X		• Major diseases of apple, causes, symptoms	X		X		Plant protection
						3.9.2.2	Will be able to control major disease, biological & chemical means.	X		X	• Control methods of diseases, advantages and disadvantages	X		X		Plant protection
3.9.3	To use chemicals		H	H	H	3.9.3.1	Will be able to identify fungicide & chemical	X	X		• Types of chemicals, uses,	X		X		Plant protection
						3.9.3.2	Will be able to prepare correct chemical solution for spraying	X		X	• Types of chemicals, recommended dosage of the chemicals for different target groups of pests and diseases	X		X		Plant protection

Works Steps		MEANS (tools, mat)	F	C	D		Skill objectives	C	P	A	Information element, learning activity	C	W/L	F	MF	Subject
3.9.4	To use spraying machine		M	M	M	3.9.4.1	Will be able to choose correct equipment	X	X		• Types of equipment for spraying, functions of the sprayers, parts of sprayers	X		X		Farm machinery
						3.9.4.2	Will be able to maintain & repair the minor damages correctly	X			• Types of equipment for spraying, functions of the sprayers, parts of sprayers	X	X			Farm machinery
3.9.5	To keep orchard sanitation		H	H	L	3.9.5.1	Will be able to know the weed pressure & clean the orchard floor	X		X	• Types of weeds, their occurrence and control methods	X		X		Plant protection
						3.9.5.2	Will be able to collect & burn/dump the waste correctly			X	• Types of orchard wastes and disposal options			X		Plant protection

Task: 3.10 To harvest the fruit										Objective The apprentice will be able to determine the time for harvest, materials for harvesting, labour requirement for given number plants, and harvest the fruits without damaging the stalk in the field.					

Works Steps		MEANS (tools, mat)	F	C	D		Skill objectives	C	P	A	Information element, learning activity	C	W/L	F	MF	Subject
3.10.1	To determine the fruit maturity		M	H	L	3.10.1.1	Will be able to judge fruit & seed colour for maturity of the fruit	X		X	• Maturity symptoms of the apple fruits			X		Crop production
3.10.2	To pick the fruit		L	M	L	3.10.2.1	Will be able to choose correct harvesting materials	X	X		• Types harvesting materials, uses			X		Crop production

Work Steps		MEANS (tools, mat)	F	C	D		Skill objectives	C	P	A	Information element, learning activity	C	W/L	F	MF	Subject
						3.10.2.2	Will be able to harvest fruit with out damaging the stalk	X		X	• Orange harvesting methods/techniques			X		Crop production
						3.10.2.3	Will be able to hire sufficient numbers of labour	X			• Labour organisation			X		Farm economic

Task: 3.11 To maintain quality of the harvested fruits											**Objective** The apprentice will be able to determine the different fruits' size, colour, shape, and grade and pack accordingly in a given containers with correct levelling.					
Work Steps		**MEANS (tools, mat)**	**F**	**C**	**D**		**Skill objectives**	**C**	**P**	**A**	**Information element, learning activity**	**C**	**W/L**	**F**	**MF**	**Subject**
3.11.1	To grade the fruits		M	M	L	3.11.1.1	Will be able to select properly the different size of the fruits	X		X	• Grading criteria, methods, uses	X		X		Post-harvest
						3.11.1.2	Will be able to identify different fruit colours correctly	X	X		• Grading criteria, methods, uses	X		X		Post-harvest
						3.11.1.3	Will be able to select properly the different shapes of the fruits	X		X	• Grading criteria, methods, uses	X	X	X		Post-harvest
3.11.2	To pack the fruits		M	M	L	3.11.2.1	Will be able to choose good packing container	X	X		• Types of packing containers, advantages and disadvantages, uses		X	X		Post-harvest

32

Works Steps		MEANS (tools, mat)	F	C	D		Skill objective	C	P	A	Information element, learning activity	C	W/L	F	MF	Subject
						3.11.2.2	Will be able to choose proper wrapping materials	X			• Wrapping materials (types, uses, merits and demerits)		X	X		Post-harvest
						3.11.2.3	Will be able to choose correct labels on the container for identification	X	X		• Types of labels, uses	X		X		Post-harvest

Task: 3.12 Marketing the produce											Objective The apprentice will be able to determine the marketing system, demand and supply, and arrange for transportation in the field.					
Works Steps		**MEANS (tools, mat)**	**F**	**C**	**D**		**Skill objective**	**C**	**P**	**A**	**Information element, learning activity**	**C**	**W/L**	**F**	**MF**	**Subject**
3.12.1	Market information		H	H	H	3.12.1.1	Will be able to judge the correct time of marketing depending on the market/auction	X	X		• Marketing, price fixations	X		X		Farm economic
						3.12.1.2	Will be able to judge the price difference in the local market & auction yard	X	X		• Marketing, price fixations		X	X		Farm economic
						3.12.1.3	Will be able to arrange appropriate transport	X			• Transport requirement of apples Negotiation techniques			X		Post-harvest

DUTIES: 4. POST HARVEST OF FRUITS AND VEGETBALES																

TASK: 4.1. PERFORM AND DEMONSTRATE POSTHARVEST AND PROCESSING IN THE FIELD

TASK OBJECTIVE: RDTC Certificate holder will be able to perform and demonstrate postharvest processing in field which include processing of fruit and vegetable crops; the impact of this task in the long run should result in longer storage in stores, reduced transportation loss and increased market price for the produce thereby increasing the income

WORK STEP		MEANS (tools, mat..)	F	C	D	SKILL OBJECTIVES		C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
4.1.1	Harvest fruit and vegetables in the field	Harvesting tools, packing materials	M	M	M	4.1.1.1	Will harvest the crops with proper tools & techniques		X		Harvesting ✓ Harvesting methods ✓ Harvesting tools ✓ Time of harvesting	X			X	PHT
						4.1.1.2	Will use proper packaging materials		X							
4.1.2	Process fruits and vegetables in the field	Water, graders, packing materials	H	H	H	4.1.2.1	Will sort and grade the products given the graders		X		Processing technique ✓ Washing, curing, proper handling Sorting & grading ✓ Methods of grading ✓ Type of graders ✓ Criteria for grading Packaging ✓ Types of packaging materials ✓ Methods of packing	X		X	X	PHT
						4.1.2.2	Will prepare the produces for packing		X							
						4.1.2.3	Will pack the products given the packing materials		X							

TASK: 4.2. PERFORM AND DEMONSTRATEON STORAGE SYSTEMS																
TASK OBJECTIVE: RDTC Certificate holder will be able to perform and demonstrate storage systems which include assessing local storage practices and their problems, perform appropriate storage techniques result in decreased storage loss and improved stored products.																

WORK STEP		MEANS (tools, mat..)	F	C	D	SKILL OBJECTIVES		C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
4.2.1	Identify local storage practices and their problems		L	M	M	4.2.1.1	Will observe/survey the local storage practices adopted by the farmers	X	X	X	Observation ✓ Observation techniques ✓ Survey & interviews					PHT
						4.2.1.2	Will identify the defects of the existing storage practices of the farmers	X		X	Storages ✓ Storage conditions (MC, air, temp.) ✓ Storage structures ✓ Storage methods ✓ Materials used					
4.2.2	Identify appropriate storage techniques		L	M	H	4.2.2.1	Will identify existing storage problems	X			Observation ✓ Observation technique					PHT
						4.2.2.2	Will select the storage techniques suited to the local condition	X			Storage Storages ✓ Storage conditions (MC, air, temp.) ✓ Storage structures ✓ Available materials for constructing stores ✓ Storage methods ✓ Storage conditions required for different crops					
						4.2.2.3	Will explain and convince of the selected storage techniques		X			X			X	PHT
4.2.3	Apply and perform storage	Materials	L	M	H	4.2.3.1	Will construct simple storage structures		X		Construction of store ✓ Storage principles ✓ Types of produce	X		X	X	PHT

											to be store ✓ Size of the storage structure					
	techniques															

| TASK: 4.3. DETERMINE ON AGRICULTURE MARKETING SYSTEM | | | | | | | | | TASK OBJECTIVE: RDTC Certificate holder will be able to determine the agriculture marketing system, determining market situation, processing for marketing and transporting; which should result in better quality products and increase income | | | | | | | |

WORK STEP		MEANS (tools, mat..)	F	C	D	SKILL OBJECTIVES		C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
4.3.1	Determine the market situation	Data on supply, demand and price	L	L	M	4.3.1.1	Will assess the demand, supply and price fluctuation in the market	X			Market situations ✓ Demand, supply, price ✓ Type of market ✓ Mode of disposal (auction, contract, vending, retailers) Market organisation ✓ Individuals ✓ Cooperative society	X X			X X	PHT
						4.3.1.2	Will assess the mode of disposal of produce and time of marketing	X								
						4.3.1.3	Will organise marketing body		X							
4.3.2	Process for marketing		H	M	L	4.3.2.1	Will prepare (wash, sort, grade) crops for marketing		X		Processing ✓ Washing, sorting, grading, handling Packaging	X			X	PHT

			F	C	D		SKILL OBJECTIVES	C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
						4.3.2.2	Will pack the produce given the packing materials to minimise loss of quality and quantity	X			✓ Packing materials ✓ Methods of packing ✓ Size of packs ✓ Labelling					
4.3.3	Transport for marketing	Means of transport	H	M	M	4.3.3.1	Will load and unload the produce without damaging	X			Loading ✓ Nature of damage caused ✓ During loading and unloading	X		X		

DUTY: 5 FARM MACHINERY		

TASK: 5.1. Operation of farm machineries	**TASK OBJECTIVE:** RDTC Certificate holder will be able to apply the skills and knowledge in the field of selection, operation, maintenance, repair and management of farm machineries, which will result in better production at the cheaper labour cost.

WORK STEP		MEANS (tools, mat..)	F	C	D	SKILL OBJECTIVES		C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
5.1.1	Identify farm tools and machineries	Tools, machineries (rice huller, attachaki, oil expeller, power tiller)	H	L	M	5.1.1.1	Will select the appropriate tools and machinery for specific crops and uses	X	X		Tools & machineries • Small tools and engine • Engine parts • Source of supply and cost	X		X		FM
						5.1.1.2	Will identify the source and cost of farm tools and machineries	X								
5.1.2	Operate simple farm tools and machineries	rice huller, attachaki, oil expeller,	H	L	H	5.1.2.1	Will be well aware of safety measures		X		Operation • Handling, safety			X		FM

5.1.3		power tiller, globs, boots				5.1.2.2	Will use proper safety equipments				measures, • Legality					
						5.1.2.3	Will handle with utmost care									
5.1.3	Perform basic repair and maintenances	rice huller, attachaki, oil expeller, power tiller, globs, boots	H	L	M	5.1.3.1	Will explain regular maintenance schedule		X		Repair and maintenance • Source of spear parts • Maintenances schedule			X		FM
						5.1.3.2	Will perform regular maintenances		X							
						5.1.3.3	Will repair simple and small tools and parts		X							

DUTY: 6. BASIC COMPUTER SKILLS																

TASK: 6.1. Perform basic computer skills	TASK OBJECTIVE: RDTC Certificate holder will be able to apply the skills and knowledge of basic computer skills, computer vocabulary, opening and saving files, MS word, excel, internet and power point, which will result in better performance of recording and communication

WORK STEP		MEANS (tools, mat..)	F	C	D	SKILL OBJECTIVES		C	P	A	INFORMATION ELEMENT OR LEARNING ACTIVITY	C	L	W	F	SUBJECT
6.1.1	Basic computer skills and knowledge	Computer	L	M	M	6.1.1.1	Will turn On and Off the computer	X	X		Computer skills • On & Off • Mouse & key board	X				BC
						6.1.1.2	Will use mouse and key board		X							
6.1.2	Computer vocabulary		L	M	L	6.1.2.1	Will identify computer parts, tool bars, menu		X		• Computer vocabulary computer parts, tool bars, menu etc.	X				BC
6.1.3	Opening and closing files		L	L	L	6.1.3.1	Will create folder and files /documents	X	X		Opening and closing files • files • save a file • folders	X				BC
						6.1.3.2	Will reinstalling the files	X	X							
6.1.4	MS word		L	L	L	6.1.4.1	Will type and edit	X	X		MS word • type & edit • check spellings • bullets, clip arts	X				BC
						6.1.4.2	Will create simple document; insert pictures									
						6.1.4.3	Will edit, format, and spell check, bullets, clip art, copying and pasting images.	X	X							
6.1.5	MS Excel		L	L	L	6.1.5.1	Will enter data, compute, make	X	X		MS excel • data entering	X				BC

							simple charts				• computation • making charts					
6.1.6	Internet		L	L	L	6.1.6.1	Will explain what is internet, browse website & web-search	X	X		Internet • about internet • website browsing • information search	X				BC
						6.1.6.2	Will create email ID									
						6.1.6.3	Will open and send email									
						6.1.6.4	Will search and down load information									
6.1.7	Power point		M	M	M	6.1.7.1	Prepare simple power point presentation	X	X		PowerPoint • identification • prepare presentation	X				BC

DUTY: 7. BASICS OF FARM ECONOMICS															

Task 7.1 To analyze farm (economics) profits?								Objective The farmer is capable and willing to analyze the farm for economic viability and reacts to the results in a way that improves the economic situation of the farm as best as possible. Decisions on what to produce are taken in the light of the existing economic situation (and market development)							

Work Steps		MEANS (tools, mat)	F	C	D		Skill objective	C	P	A	Information element, Learning activity	C	W/L	F	MF	Subject
7.1.1	Analyze economic profitability of overall farm		M	H	M	7.1.1.1	To determine basic data needed for the analysis	X		X	• data (where to find, how to calculate) • standard data, their strengths and limitations	X X				Farm Economics
						7.1.1.2	To explain and list financial key-factors.		X		• factors for economic analysis & how to calculate /derive them • liquidity cash-flow: profit/loss • calculate the above factors for own situation • calculate using standards (and compare results)	X X X			X X	Farm Economics
7.1.2	Analyze economic profitability of farm branches		M	H	M	7.1.2.1	To determine the basic data needed for the analysis or to use standard data	X		X	• important data (where to find, how to calculate) • standard data, their strengths and limitations	X X				Farm Economics

							7.1.2.2	To explain & list down financial key-factors		X		• key factors for economic analysis and how to calculate /derive them – minimum: • liquidity cash-flow profit/loss • calculate the above factors for own situation • calculate using standards (and compare results)	X X X				Farm Economics
7.1.3	React to findings so as to optimize farm economics			M	M	M	7.1.3.1	To take decisions based on the above analysis		X		• perform analysis for own farm (or given farm, or school farm) and make suggestion for improvement	X			X	Farm Economics
							7.1.3.2	To prepare the implementation plan and to implement the decision	X		X	• tools and methods to plan activities realistically (timing, resources)	X				Farm Economics

Task 7.2 To Maintain Financial Records								Objective The farmer is capable to choose and use an accounting system that is appropriate to the given situation. (S)He is capable and willing to keep the necessary records and to consolidate them into the needed information.							
Work Steps	MEANS (tools.mat)	F	C	D		**Skill objectives**	P	C	A	Information element, Learning activity	C	W/L	F	MF	**Subject**
7.2.1 Find appropriate type of accounting		M	H	M	7.2.1.1	To define own needs and chose accordingly		X		Types of accounting o cash-book	X				Farm Economic
7.2.2 Open accounting system		M	H	M	7.2.2.1	To open cash accounts (with data from balance)	X		X	• cash accounts (format) • to open a accounting system with a given cash balance	X				Farm Economic
					7.2.2.2	To open a bank account balance	X		X	• to open a accounting system with a given bank account balance	X				Accounting
					7.2.2.3	To set-up/adjust an inventory	X		X	• inventory (format, setting one up and adjusting is)	X				Accounting
					7.2.2.4	To record existing loans in the accounts	X		X	• various kinds of funds (active, passive)	X				Accounting
7.2.3 To keep the records/ do actual accounting		H	H	M	7.2.3.1	To file and number receipts	X			• receipt handling (numbering, filing)	X				Accounting
					7.2.3.2	To enter financial transactions etc. in the accounting system	X		X	• "booking-rules" • practise the use of various systems of keeping record of transactions	X X				Accounting

43

							7.2.3.3	To do regular balance check for validation of the accounting	X	X		• calculation of balance • how to use a balance cross check technique • practise with given example	X				Accounting
							7.2.3.4	To prepare loan management plan(interest payment and pay-back)	X			• basic knowledge about loans (interest rates, various systems of pay-back) • interest calculation	X X				Accounting
7.2.4	close the accounts			M	H	M	7.2.4.1	To check the final balances in the various accounts	X			• calculate final balance of an account • interpretation of balance (practise)	X				Accounting
							7.2.4.2	To prepare of balance sheet	X		X	• balance sheet format, content and how to use	X				Accounting
							7.2.4.3	To calculate the farm results (profit/loss, economic profitability of farm)	X		X	• basic calculation • profit/loss calculation for different enterprises and overall • cash-flow, liquidation calculation, …	X				Accounting

Works Steps		MEANS (tools, mat)	F	C	\D		Skill objective	C	P	A	Information element, Learning activity	C	W/L	F	MF	Subject
						7.2.4.4	To adjust value of inventory	X			• concept of depreciation • standards commonly used to determine depreciation • add inventory changes to the accounting system/balance	X X				Accounting

Task: 7.3 To collaborate with others, where it makes sense	**Objective** The farmer has an open attitude towards collaboration and is capable to realistically judge the usefulness of collaboration in any given situation. For this judgement s(he) looks at both financial and social aspects of collaboration. S(He) improves the functioning and viability of the own farm by working together with others, if and where it makes sense, including the withdrawal from a group if the need is not given anymore.

Works Steps		MEANS (tools, mat)	F	C	\D		Skill objective	C	P	A	Information element, Learning activity	C	W/L	F	MF	Subject
7.3.1	To evaluate potential of collaboration		L	M	H	7.3.1.1	To determine positive and negative points of own collaboration with others (for own situation)		X		• important aspects of collaboration • tools for situation analysis • feasibility study • self-assessment (strengths, weaknesses) in light of	X X X X x				Farm Planning

										contribution to group • critical attitude (towards self and others)						
7.3.2	To chose appropriate form of collaboration					7.3.2.1	To list the pros and cons of the various forms of collaboration and chose the optimal one	X	X		• most important (for Bhutan) forms of collaboration (informal, formal like cooperative, association), their strengths and limitations • SWOT Analysis for concrete situation, looking at social, financial and work-related aspects • tools for decision taking	X x				Farm Planning
7.3.3	To maintain/ discontinue collaborations		L	M	M	7.3.3.1	To explain the processes and needed structures in a group		X		• functions in a group • stages of team-building • minute taking/record keeping • stages of an enterprise (formation, development, full-blown, "dis-solving")	X				Farm Planning
						7.3.3.2	To explain the advantage and disadvantage of being membership in the group.		X		• critical attitude • SWOT Analysis • decision taking					Farm Planning

DUTY: 8: SOIL FERTILITY MANAGEMENT															
TASK: 8.1 CARRY OUT SOIL FERTILITY MANAGEMENT ACTIVITIES									**TASK OBJECTIVE:** RDTC Certificate holder will be able to carry out soil fertility development activities which includes determining soil improvement techniques, identify and select methods of soil improvement techniques; the impact of this task in the long run should result in sustainable farming system.						
WORK STEP		**MEANS (Tools, mat..)**	**F**	**C**	**D**	**SKILL OBJECTIVES**		**C**	**P**	**A**	**INFORMATION ELEMENT OR LEARNING ACTIVITY**	**C**	**L**	**W**	**F**	**SUBJECT**
8.1.1	Determine the soil improvement techniques		L	H	M	8.1.1.1	Will be able to select suitable methods for soil improvement	X			Methods of soil improvement • Crop rotation, green manuring, legumes, compost, FYM, fertilizers, soil amendment	X			X	M&F
8.1.2	Select best methods of soil improvement techniques	Sickles, spade, comost materials	L	H	M	8.1.2.1	Will be able to prepare FYM, compost and mixing fertilizers, given materials and procedures		X		Preparation • FYM, Compost, Composting materials, mixing fertilizers, role of organic materials in soil improvement Application • Time of application, methods of application, selections of methods,top dressing	X			X	M&F
						8.1.2.2	Will be able to apply FYM, compost and inorganic fertilizers		X							
						8.1.2.3	Will be able to select suitable cropping pattern		X							

									for improving soil status				Cropping pattern Green manure • Species of green manure, duration/growth • Harvesting stage, incorporation techniques, • Time of incorporation		X		X	M&F
								8.1.2.4	Will be able to select, grow, harvest nad incorporate green manure	X	X							
								8.1.2.	Will be able to handle the PP equipments properly in the field conditions		X			X		X	M&F
								8.1.2.	Will be able to carry out cultural/biological control measures in the field conditions		X						
								8.1.2.7	Should be able to prepare chemicals given formulation of chemicals and recommendations		X						

Key:

F=Frequency C=Criticality D=Difficulty	L=Low M=Medium H=High	C=Cognitive P=Psychomotor A=Affective	C=Class L= Laboratory W= Workshop F=Field