



Japan International Cooperation Agency



Agriculture and Food Authority
Horticultural Crops Directorate



Ministry of Agriculture, Livestock and Fisheries
State Department for Crop Development & Agricultural Research

Smallholder Horticulture Empowerment & Promotion Project for Local and Up-Scaling (SHEP PLUS)

*“Changing Farmers’ Mindset from **“Grow and Sell”** to **“Grow to Sell”**”*

GENERAL HORTICULTURAL CROP PRODUCTION & POST-HARVEST HANDLING TECHNIQUES (GHCP&PHHT) 20



Prepared by SHEP PLUS

Training Title: General Horticultural Crop Production & Post-Harvest Handling Techniques (GHCP&PHHT) 20**Objective:** To provide a guide on production of horticultural crops using twenty (20) basic techniques**Specific Objectives:**

- To provide basic knowledge & information on production and post-harvest handling techniques of horticultural crops
- To provide knowledge & information on 20 techniques as a check list to improve farming techniques of individual farmers

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GENERAL HORTICULTURAL CROP PRODUCTION & POST-HARVEST HANDLING TECHNIQUES (GHCP&PHHT) 20, First published by SHEP in 2009, revised by SHEP PLUS in 2019 (Ver.6)

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1. Introduction: Background

Handout 3-1 (For Farmers)

General Horticultural Crop Production & Post-Harvest Handling Techniques (GHCP&PHHT) 20

[PART 1: Background Information]

County:..... Sub-county:..... Date(DD/MM/YYYY): / /

Group Name:..... Tel. No.

Name of Farmer: Male: Female: Farmer Code:.....

[PART 2 : Horticultural Crops Production Techniques](Please tick appropriately for "YES" or "NO")

Pre to Post Cultivation Stages		Items	Horticultural Techniques Advocated for Adoption	Yes*	No
1	Pre-Cultivation Preparation	Q 1	Do you undertake a market survey to determine the crop(s) to cultivate ?		
		Q 2	Do you use crop planting calendar(s) to plan production for the next cropping season?		
		Q 3	Do you undertake soil testing at least once in two to three years ?		
		Q 4	Do you use recommended composting practices by using different organic materials to supply major nutrients: Nitrogen (N), Phosphorus (P), and Potassium (K) in preparing compost/manure?		
		Q 5	Do you use recommended quality planting material(s) with one or more of the following characteristics: disease resistance and tolerance, high yield, early maturity, better tastes, size, and longer shelf life?		
2	Land Preparation	Q 6	Do you use one or more of the following recommended land preparation practices in management of pests & diseases: Soil solarization, timely ploughing, appropriate depth of ploughing, and minimum tillage?		
		Q 7	Do you incorporate crops residues at least two months before planting to enhance recycling of nutrients?		
		Q 8	Do you incorporate compost/manure or organic fertilizer as a basal application at least 1-2 weeks before planting?		
3	Crop Establishment (Planting/ Transplanting)	Q 9	Do you use recommended practices in raising seedlings or use seedlings raised from registered nursery(s) ?		
		Q 10	Do you use recommended planting/transplanting spacing ?		
		Q 11	Do you plant/transplant using recommended fertilizer application rates ?		

Fig.1: A check list of the GHCP&PHHT 20

1. Introduction: Background

Topic	Sub-Topic	Item	Yes	No	NA
1. Pre-Cultivation Preparation	1.1. Market survey, crop planting calendar(s), soil testing, composting, and quality seed/planting material(s)	1.1.1. Do you have a market survey report for your crop?			
		1.1.2. Do you have a crop planting calendar for your crop?			
		1.1.3. Do you have a soil testing report for your crop?			
		1.1.4. Do you have a quality seed/planting material for your crop?			
2. Land Preparation	2.1. Land preparation practices, incorporation of crop residues, and basal application	2.1.1. Do you use any land preparation practices?			
		2.1.2. Do you incorporate crop residues into the soil?			
		2.1.3. Do you apply basal fertilizer to your crop?			
		2.1.4. Do you use any other land preparation practices?			
3. Crop Management	3.1. Supplemental watering, managing weeds, top-dressing, pests & diseases management practices, and safe & effective use of pesticides	3.1.1. Do you water your crop supplementally?			
		3.1.2. Do you manage weeds in your crop?			
		3.1.3. Do you top-dress your crop?			
		3.1.4. Do you use pesticides in your crop?			
4. Harvest/Post-Harvest Handling/Cost and Income Analysis	4.1. Harvesting indices; Post-Harvest Handling (appropriate containers/standard packaging materials, and value addition techniques); and Cost and Income Analysis (cost and income analysis)	4.1.1. Do you harvest your crop at the right time?			
		4.1.2. Do you use appropriate containers for your crop?			
		4.1.3. Do you use standard packaging materials for your crop?			
		4.1.4. Do you analyze the cost and income of your crop?			

Fig. 1: A check list of the GHCP&PHHT 20 (G20)

- This training material applies the fundamental practices essential for horticultural crop productivity and successful marketing.
- The fundamental practices are categorized into seven (7) broad topics and twenty (20) sub-topics; the twenty sub-topics are referred to as the General Horticultural Crop Production and Post-Harvest Handling Techniques (GHCP&PHHT20). This categorization is based on the Smallholder Horticulture Empowerment Project (SHEP) experience in mitigating production and marketing challenges facing smallholder horticultural farmers.
- The seven (7) broad topics are: Pre-Cultivation Preparation; Land Preparation; Crop Establishment (Planting/Transplanting); Crop Management; Harvest; Post-Harvest Handling; and Cost and Income Analysis.
- The sub-topics under each topic are as follows: **Pre-Cultivation Preparation** (market survey, crop planting calendar(s), soil testing, composting, and quality seed/planting material(s)); **Land Preparation** (land preparation practices, incorporation of crop residues, and basal application); **Crop Establishment** (raising seedlings, spacing, fertilizer application); **Crop Management** (supplemental watering, managing weeds, top-dressing, pests & diseases management practices, and safe & effective use of pesticides); **Harvest** (harvesting indices); **Post-Harvest Handling** (appropriate containers/standard packaging materials, and value addition techniques); and **Cost and Income Analysis** (cost and income analysis).
- The issues outlined in the twenty (20) sub-topics might not necessarily be applicable in all the cases. However, where applicable, it is recommended that the instructions issued be given due consideration.

2. GHCP&PHHT: Pre-Cultivation Preparation: Q1



Farmers conducting a market survey

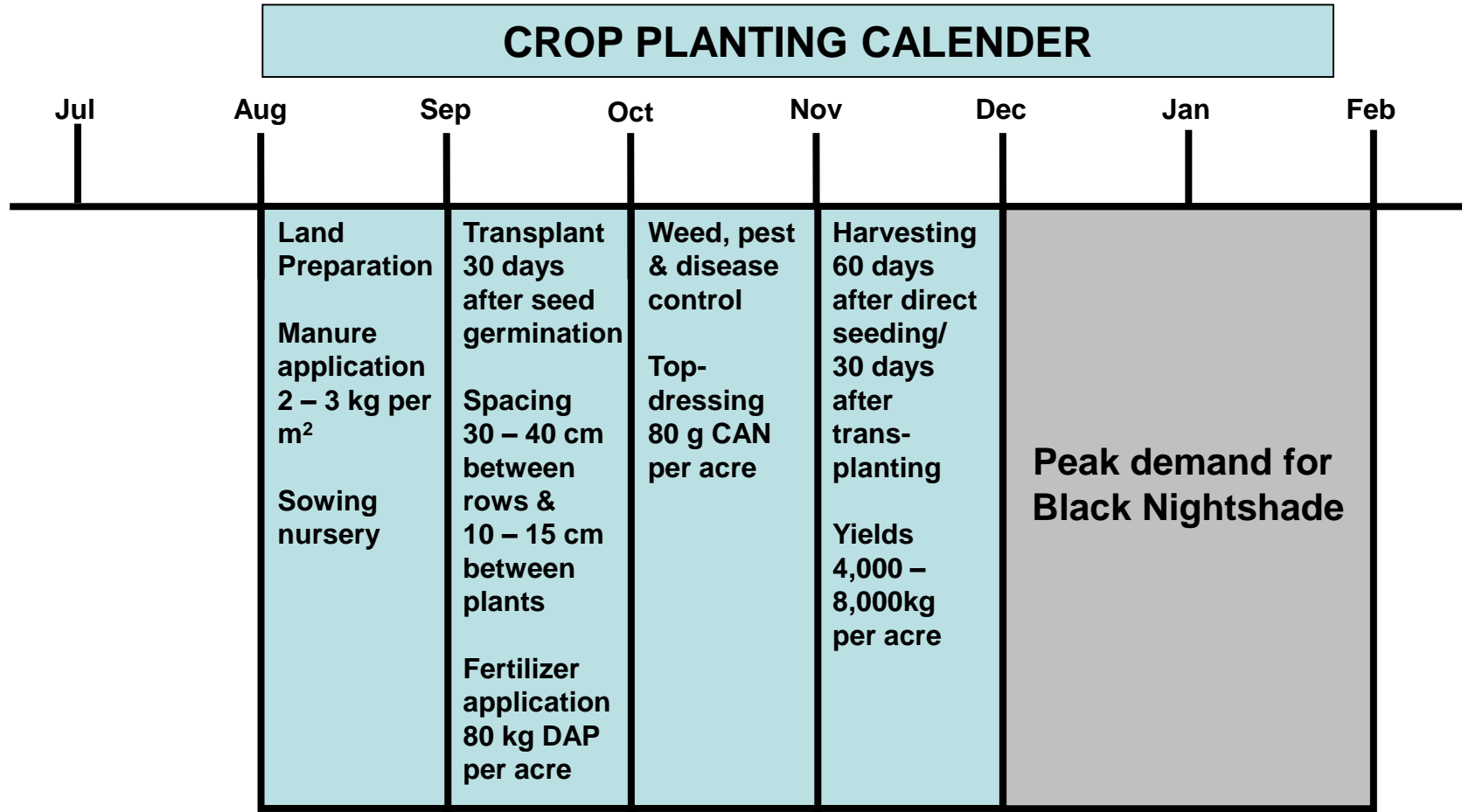
2. GHCP&PHHT: Pre-Cultivation Preparation: Q1 Market Survey



**Farmers conducting a
market survey**

- **Market Survey (GHCP&PHHT20: Q1)**
“Do you undertake a market survey to determine the crop(s) to cultivate?”
- Most smallholder farmers are not in touch with the present reality about the market. Therefore, they tend to struggle selling what they have produced rather than producing what they can sell.
- Market surveys provide useful information in guiding a producer (farmer) in producing what he/she can sell
- The GHCP&PHHT 20 recognizes market survey as the first fundamental practice that smallholder farmers must undertake regularly in order to realize economic returns from the farming.
- Market surveys need not be cumbersome; farmers should obtain the following information on the crop (s) of their choice:
 - During which month there is **peak demand** for the crop
 - The **price** of the crop during the peak demand
 - The crop **variety** that has the highest demand
 - **Supply requirements** (quantities and frequency)
 - **Quality** of market requirements
 - The **source** of current supply
 - Potential buyers and terms and modes of payment
 - Marketing challenges, trader’s willingness to buy from them
- The answers to the above questions determine what the farmer can sell in terms of quality, quantity and the anticipated profit margins

2. GHCP&PHHT: Pre-Cultivation Preparation: Q2



A Black Nightshade Planting Calendar

2. GHCP&PHHT: Pre-Cultivation Preparation: Q2 Crop Planting Calendar

CROP PLANTING CALENDER

A	S	O	N	D	J
Land Preparation	Transplant 30 days after seed germination	Weed, pest & disease control	Harvesting 60 days after direct seeding/ 30 days after Trans- planting	Peak demand for Black Nightshade	
Manure application 2 – 3 kg per m ²	Spacing 30 – 40 cm between rows & 10 – 15 cm between plants	Top- dressing 80 g CAN per acre	Yields 4,000 – 8,000kg per acre		
Sowing nursery	Fertilizer application 80 kg DAP per acre				

A Black Nightshade Planting Calendar

➤ Crop Planting Calendar (GHCP&PHHT20: Q2)

“Do you use **crop planting calendar(s)** to plan production for the next cropping season?”

- A **crop planting calendar** is a tool for farmers to plan for production to ensure that marketing coincides with the period of the year when the **market price of a produce is highest**

Procedure

1. Determine from the **market survey** results (GHCP&PHHT 20: Q1) when there is **peak demand** for selected crops
2. Work backward from the month when there is peak demand to prepare monthly farm activities preceding the peak period
3. Use the monthly activities preceding the peak as a procurement plan for farm inputs and a guide for farm operations

2. GHCP&PHHT: Pre-Cultivation Preparation: Q3



Collecting soil samples

2. GHCP&PHHT: Pre-Cultivation Preparation: Q3 Soil Sampling & Analysis



Collecting soil samples

➤ Soil Sampling & Analysis (GHCP&PHHT20: Q3)

“Do you undertake **soil testing** at least once in two to three years?”

- It is recommended to have the soils analyzed for **nutrient availability** and other factors vital to crop production after **every 2-3 years**
- The results of the **soil analysis** should be used to determine **fertilizer** and **manure requirement**
- Establishing the **type** and **quantity** of fertilizer one needs to apply is vital in:
 - **Increase** production
 - Avoiding making the soils either too acidic or alkaline
 - Saving expenditure on inputs thus **reducing** the **cost** of production and increasing the **profitability**

2. GHCP&PHHT: Pre-Cultivation Preparation: Q4



Manure preparation through composting

2. GHCP&PHHT: Pre-Cultivation Preparation: Q4 Composting



**Manure preparation
through composting**

➤ Composting (GHCP&PHHT20: Q4)

“Do you use **recommended composting practices** by using different organic materials to supply major nutrients: Nitrogen (N), Phosphorus (P), and Potassium (K)? ”

- Most smallholder farmers apply either immature or inadequate quantity of manure/compost
- Most smallholder farmers do not have money to purchase adequate amount of inorganic fertilizers
- Due to significant role of manure in increasing crop productivity, farmers need to adopt more efficient methods of preparing the manure.
- Adopting more efficient methods of preparing manure will ensure **optimal application**, thus **increasing productivity**

2. GHCP&PHHT: Pre-Cultivation Preparation: Q5



Photos: SHEP PLUS

Assorted quality seeds

2. GHCP&PHHT: Pre-Cultivation Preparation: Q5 Quality Planting Materials



Photos: SHEP PLUS

Assorted quality seeds

➤ Quality Seed/Planting Materials (GHCP&PHHT20: Q5)

“Do you use recommended **quality planting material(s)** with one or more of the following characteristics: disease resistance and tolerance, high yielding, early maturing, better tastes, size, and longer shelf life?”

- The fifth fundamental practice of the GHCP&PHHT is the use of quality seed/planting material(s)
- Use of **quality seed/planting material(s)** can positively improve the returns of smallholder farmers for **two (2) major reasons**:
 - **High yields**
 - **Less expenditure** on control of **pests and diseases**, since the materials are either resistant or tolerant to the menace
- The overall effect is **higher net income**

3. GHCP&PHHT: Land Preparation: Q6



Land preparation using a hoe (Jembe)

3. GHCP&PHHT: Land Preparation: Q6

Land Preparation Practices



**Land preparation using
a hoe (Jembe)**

➤ Land Preparation Practices (GHCP&PHHT20: Q6)

“Do you use one or more of the following **recommended land preparation practices** in management of pests & diseases: **Soil solarization, timely ploughing, appropriate depth of ploughing and minimum tillage?**”

- **Land preparation** is critical in **management of soil borne pests and diseases** and the recycling of soil nutrients
- One or more of the following practices recommended for management of soil borne pests and diseases should be undertaken where applicable:
 - **Soil solarization** especially in the establishment of the nursery
 - **Timely ploughing** and exposure of pests to desiccation
 - **Minimum movement of soil** to check on the spread of **pests and diseases**
- In addition, the soil should be ploughed to a minimum depth of 30 cm and inverted; it is vital to break the hard pan, thus ensuring proper root establishment; and the recycling of nutrients that tend to get leached.
- Also, minimum tillage could be an option to conserve soil fertility.

3. GHCP&PHHT: Land Preparation: Q7

3-2



Photo: SHEP PLUS

Incorporation of crop residues

3. GHCP&PHHT: Land Preparation: Q7

Incorporation of Crop Residues

3-2



Incorporation of crop residues

➤ Incorporation of Crop Residues (GHCP&PHHT20: Q7)

“Do you **incorporate crop residues** at least two months before planting to enhance recycling of nutrients?”

- **Incorporating crop residues** into the farm is a sustainable means of recycling the soil nutrients and structure
- The crop residues should be incorporated to a depth of **30 cm** at least **2 months** before planting to allow decomposition
- Where need be, the crop residues should be **chopped** into smaller pieces to hasten the decomposition process
- However, diseased material should be discarded to avoid possible risk of disease build-up

3. GHCP&PHHT: Land Preparation: Q8



Basal application of organic manure/fertilizer

3. GHCP&PHHT: Land Preparation: Q8

Basal Application



Basal application of organic manure/fertilizer in the field

➤ Basal Application (GHCP&PHHT20: Q8)

“Do you incorporate compost/manure/organic fertilizers as a **basal application** at least 1-2 weeks before planting?”

- The release of nutrients from manure/compost is a slow process. Therefore, for crops to maximize on nutrient released from manure/compost, it should be applied **1 – 2 weeks before planting or transplanting**
- The manure/compost should never be exposed to direct sunlight as the material tend to lose nitrogen through volatilization
- The applied manure/compost should be broadcasted then worked into the soil
- Use of partially decomposed manure/compost should be avoided as this tends to compound the problem of soil borne pests and diseases

4. GHCP&PHHT: Crop Establishment: Q9



Nursery of leafy vegetables

4. GHCP&PHHT: Crop Establishment: Q9

Raising Seedlings



**Nursery of leafy
vegetables**

➤ Raising Seedlings (GHCP&PHHT20: Q9)

“Do you use recommended practices in **raising seedlings** or **use seedlings raised from registered nursery(s)**?”

- **Raising healthy seedlings** should be the ultimate goal of every farmer
- This should start with appropriate location of the nursery
- The nursery should be located at a site that has not been planted with crops in the family of the seedlings to be raised for at least three **(3) years**
- Sterilization of the nursery site through solarization is a feasible option for smallholder farmers
- Conditions that are likely to predispose seedlings to pest and diseases such as overcrowding, dampness, and excessive shading should be avoided
- Seedlings should be hardened **1 – 2 weeks before transplanting** by reducing the frequency of watering and shading
- Other than on-farm, seedlings should only be sourced from **registered and certified nurseries**
- **Seed dressing** can be an option to **control soil/ seed borne** pests and diseases (Refer to the latest **PCPB list** for specific products appropriate for specific crops)
- Thiamethoxam + Metalaxyl –M + Difenoconazole (APRON STAR®)
- Imidacloprid (MURTANO®, MONCERN®)
- Thiram (THIRAM 80WP®)

4. GHCP&PHHT: Crop Establishment: Q10



Transplanted Black Nightshade seedlings

4. GHCP&PHHT: Crop Establishment: Q10 Planting/Transplanting Spacing



**Transplanted Black
Nightshade seedlings**

➤ Transplanting (GHCP&PHHT20: Q10)

“Do you use recommended **planting/transplanting spacing**?”

- Seedlings should be transplanted at the **recommended** stage and **spacing** (check the label of the seed packet)
- Right spacing **minimizes** pest and disease **incidences**, eases farm operations such as weeding, and has the overall effect of improved productivity
- Avoid transplanting **immature and overgrown** seedlings as they will have poor take off
- **Line planting/transplanting** using a string makes field operations easier

4. GHCP&PHHT: Crop Establishment: Q11



Different types of fertilizers

4. GHCP&PHHT: Crop Establishment: Q11 Fertilizer Application Rates



**Different types of
fertilizers**

➤ Fertilizer Application Rates (GHCP&PHHT20: Q11)

“Do you plant/transplant using recommended **fertilizer type and application rates**?”

- Adhere to the recommended planting/transplanting fertilizer application rates
- Inorganic fertilizers (DAP, CAN, TSP etc.) should thoroughly be mixed with the soil to avoid scorching as this can also lead to poor crop stand
- The **effectiveness** of fertilizers is highly dependent on **soil pH**, therefore, it is recommended to have the **soils analyzed periodically** so as to determine the type and quantity of fertilizer to apply

5. GHCP&PHHT: Crop Management: Q12



Drip irrigation

5. GHCP&PHHT: Crop Management: Q12

Water Requirement

5-1



Photo: SHEP PLUS

Drip irrigation

➤ Water Requirement (GHCP&PHHT20: Q12)

“Do you **supplement water** through one or more of the following irrigation methods: watering can, overhead, drip, basin and furrow?”

- Depending on the rainfall during the growing period of the crop, it might be necessary to supplement rainfall through irrigation
- The type of irrigation to be applied should take into consideration **disease prevalence**. For instance, in areas with high prevalence of “Early Blight” of Tomato, furrow irrigation is preferred to overhead/sprinkler irrigation; the latter favors spread of “Early Blight”
- Overhead/sprinkler irrigation is preferred to furrow irrigation in areas with high prevalence of “Late Blight” of Tomato.
- Other factors to consider when choosing an irrigation system include terrain, soil type, cost, technical know-how, type of crop and climatic conditions
- Besides water utilization efficiency, stage of growth and type of the plant (fruit bearing or vegetative) should be considered
- For fruit bearing and flowering crops, furrow and drip irrigation are preferred over overhead/sprinkler irrigation which causes fruit rot and flower drop
- Irrigation water should be applied as per the recommendations
- **Irregular** application of irrigation water can lead to defects such as “**Blossom-end Rot**”, **toughness, strong flavor, cracking, irregular fruit shape, and poor tip filling**
- Inadequate water leads to **water stressed** crops with **significantly reduced yield**
- In addition, the crops are highly susceptible to pests and diseases

5. GHCP&PHHT: Crop Management: Q13



Weeding Kales using simple tools

5. GHCP&PHHT: Crop Management: Q13

Managing of Weeds



Weeding Kales using simple tools

➤ Managing of Weeds (GHCP&PHHT20: Q13)

“Do you ensure timely weeding and use of **appropriate weeding practices** in managing weeds?”

- Weeds are suppressive to **crop growth**, and **yields**.
- They act as **alternative hosts** to many pests and diseases of economic importance to crops
- More often, smallholder farmers unintentionally aid in weed proliferation by either weeding **seeded** weeds; or **chopping** the **weed** into smaller propagules for the vegetatively propagated weeds
- **Timely** and regular weeding is **important** to suppress weeds
- Avoid weeding in wet condition as it may lead to **soil compaction**.
- Use of **appropriate herbicides** cuts down on labour (costs) and improves farmers' income

5. GHCP&PHHT: Crop Management: Q14



Top-dressed Cabbages

5. GHCP&PHHT: Crop Management: Q14

Top-dressing



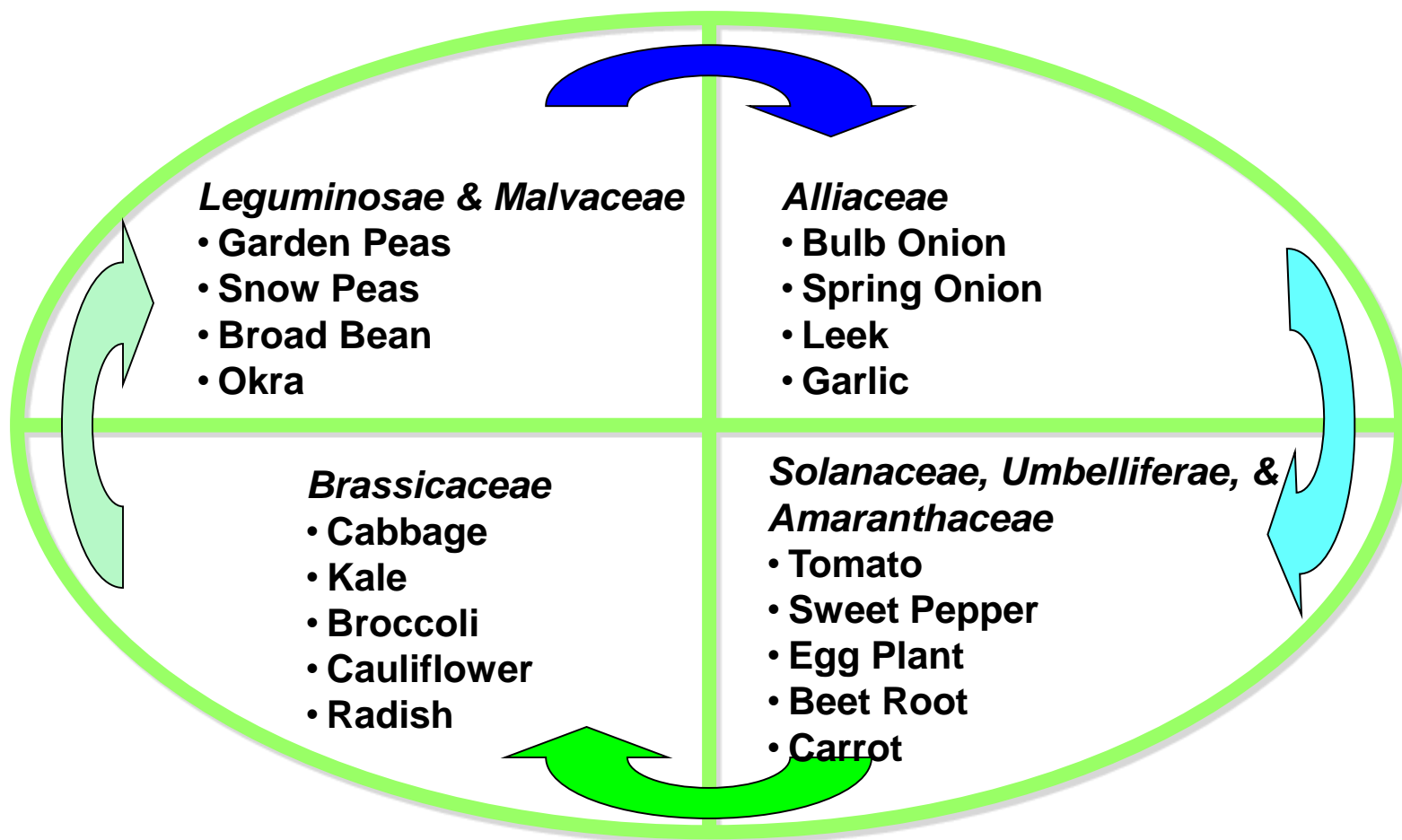
Top-dressed Cabbages

➤ Top-dressing (GHCP&PHHT20: Q14)

“Do you undertake **appropriate top-dressing practices: timeliness, type, recommended rate of application and method of application?**”

- Top-dressing fertilizers are essential for **vigorous crop growth** and better **yields**
- To achieve the desired results, the fertilizers must be applied appropriately in terms of: timing; type and quantity; and the method
- Top-dressing fertilizer should be applied when the **root system** of the seedling is well establish to enable faster uptake by the crop
- Top-dressing fertilizers can be applied through placement methods, and fertigation method
- The effectiveness of fertilizers is highly dependent on soil pH, it is recommended to have the soils analyzed periodically (**2-3 years**) so as to determine the type and quantity of fertilizer to apply

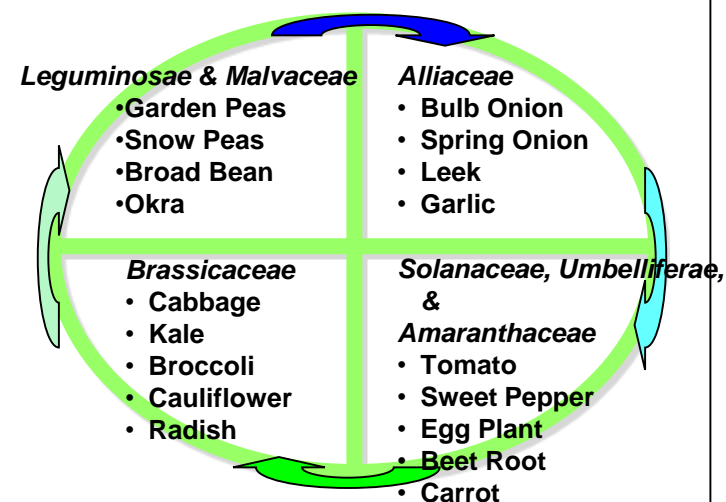
5. GHCP&PHHT: Crop Management: Q15



An example of a Crop Rotation

5. GHCP&PHHT: Crop Management: Q15

Pests and Diseases Control/Management



**An example of a
Crop Rotation**

➤ **Pest and Disease Control/Management (GHCP&PHHT20: Q15)**
“Do you use at least two of the following Integrated Pests Management (IPM) practices: cultural, biological, physical and chemical?”

- Pests and diseases can be managed through either single control strategies or an integration of **two** (2) or **more** methods
- The single control strategies are: cultural; physical; biological; and chemical

Cultural Control:

- Involve managing the environment in which the crop is growing/grows with a view of maintaining pest and disease below the harmful level
- The cultural methods include: field sanitation/hygiene, intercropping, crop rotation, furrowing, flooding, solarization etc.

Physical Control

- Physical control involve use of insect traps, hand picking, screening house, weeding etc.

Biological Control

- This involves use of natural enemies (predators and parasitoids), resistant/tolerant varieties, trap plants, push and pull system, and repellent plants

Chemical Control

- This involves use of pesticides
- Pesticides are preferred because of the quick effect; they have high efficacy
- Pesticide usage has been linked to environmental degradation, development of resistance, and should be used as last resort

Integrated Pest Management (IPM)

- IPM integrates two or more strategies (cultural, mechanical, biological and as a last resort, chemical control) to minimize the crop loss caused by pests and diseases.

5. GHCP&PHHT: Crop Management: Q16



Putting on protective clothing before application of pesticide

5. GHCP&PHHT: Crop Management: Q16

Safe & Effective Use of Pesticides



**Putting on protective clothing
before application of pesticide**

➤ Safe & Effective Use of Pesticides (GHCP&PHHT20: Q16)

“Do you observe **safe and effective use of pesticides**: appropriate protective clothing, recommended pesticides, appropriate doses, proper disposal and Pre Harvest Interval (PHI)?”

- Pesticides are harmful both to people and the environment and this has led to restriction and ban of some pesticides
- To minimize the negative effect of pesticides, there is need for smallholder farmers to be sensitized on aspects such as: recommended pesticides; dosage; re-entry interval; Pre-Harvest Interval (PHI); MRLs; appropriate usage of pesticides application devices; protective clothing, storage and disposal of pesticides and their containers.

6. GHCP&PHHT: Harvest: Q17



Harvesting Cabbages

6. GHCP&PHHT: Harvest : Q17

Harvesting Indices



Harvesting Cabbages

➤ Harvesting Indices (GHCP&PHHT20: Q17)

“Do you use at least one of the following **harvesting indices**: color, size, shape and firmness?”

- The shelf life of a produce is **highly correlated** to the physiological/ horticultural maturity at harvesting
- Therefore, understanding the **unique characteristics** of different produce at physiological maturity is vital in ensuring that **only mature** produce is harvested
- This greatly reduces the **post-harvest losses** associated with produce harvested prematurely
- Below are the harvesting indices for different produce
 - **Color** of the skin & seeds (e.g. Tomato, Chili, and Passion Fruits)
 - **Size** of leaves & fruits (e.g. Kale, Banana, and Pineapple)
 - The **sound** when thumped (e.g. Watermelon, Melon, and Cabbage)
 - **Shape of produce** e.g. mature bananas are more rounded

7. GHCP&PHHT: Post-Harvest Handling: Q18



Tomatoes packaged in wooden crates

7. GHCP&PHHT: Post-Harvest Handling: Q18 Containers & Packaging Materials



➤ Containers & Packaging Materials (GHCP&PHHT20: Q18)

“Do you use **post harvest handling containers** with the following characteristics: well-ventilated, easy to clean and smooth thus managing damages?”

- Other than the physiological maturity at harvesting, post-harvest handling greatly influences the produce **quality**; **shelf life**; and post-harvest **losses**
- In view of this, there is need for appropriate post-harvest handling of produce in terms of: sorting, grading, cleaning, packaging material(s), transportation, and storage

Tomatoes packaged in wooden crates for transportation

7. GHCP&PHHT: Post-Harvest Handling: Q19



Graded French beans in a pack house

7. GHCP&PHHT: Post-Harvest Handling: Q19 Value Addition Techniques



**Graded French beans
in a pack house**

➤ Value Addition Techniques (GHCP&PHHT20: Q19)

“Do you apply any of the following recommended **value addition techniques**: sorting, grading, cleaning, packaging or processing of produce?”

- Markets for fresh produce have become increasingly competitive in terms of produce quality
- There is need for farmers to add value to their produce in terms of presentation and processing for the products to be competitive
- Value addition techniques that are compatible with the **cottage industry** should be promoted for **smallholder farmers**.

8. GHCP&PHHT: Cost & Income Analysis: Q20 (1/2)

(A) Input cost & other costs

Date	Type of input/ any other remarks	Quantity	Cost (Ksh)
1 st Oct	Tomato Seeds (Cal J)	75g	500
3 rd Oct	Fertilizer (DAP)	50kg	2,000
12 th Nov	Pesticide (Duduthrin)	200ml	200
.....
.....
5 th Dec	Crates	20	120
Grand Total of Input & Other costs (A)			10,700

(B) Labour cost (should include family labour)

Date	Farm activity	Cost (Ksh)
3 rd Oct	Land Preparation	250
6 th Oct	Nursery Establishment	1,100
23 rd Oct	Transplanting	600
27 th Oct	Weeding	300
.....
.....
19 th Dec	Harvesting	1,300
20 th Dec	Transportation	350
Grand Total of Labour cost (B)		5,700

$$\begin{array}{r}
 \text{Grand Total of Input \& Other costs (A)} + \text{Grand Total of Labour cost (B)} = \text{Total Production Cost (A+B)} \\
 \hline
 10,700 \quad + \quad 5,700 \quad = \quad 16,400
 \end{array}$$

7. GHCP&PHHT: Cost & Income Analysis: Q20 Farm Records (1/2)

(A) Input cost & other costs

Date	Type of input/ any other remarks	Quantity	Cost (Ksh)
1 st Oct	Tomato Seeds (Cal J)	75g	500
3 rd Oct	Fertilizer (DAP)	50kg	2,000
12 th Nov	Pesticide (Duduthrin)	200ml	200
5 th Dec	Crates	20	120
Grand Total of Input & Other costs (A)			10,700

(B) Labour cost (should include family labour)

Date	Farm activity	Cost (Ksh)
3 rd Oct	Land Preparation	250
6 th Oct	Nursery Establishment	1,100
23 rd Oct	Transplanting	600
27 th Oct	Weeding	300
19 th Dec	Harvesting	1,300
20 th Dec	Transportation	350
Grand Total of Labour cost (B)		5,700

$$\begin{array}{r} \text{Grand Total of Input \& Other costs (A)} + \text{Grand Total of Labour cost (B)} = \text{Total Production Cost (A+B)} \\ \hline 10,700 + 5,700 = 16,400 \end{array}$$

(A) Input cost and other cost

- Keep records of all the expenditure in input cost with Date/ Type of input/ Quantity/ Cost.
- In the last row, sum up all the recorded cost (A)

(B) Labour Cost

- Keep records of all the labour cost which includes family labour with Date/ farm Activity/ Cost.
- In the last row, sum up all the recorded labour cost (B)

(A+B) Total Production Cost

- Add (A) to (B) to find out Total Production Cost

- **Cost & Income Analysis (GHCP&PHHT20: Q20)**
- “Do you keep farm records to determine the profitability of the enterprise(s)?”**
- Viable decisions on any enterprise can only be based on accurate data or information. Such decisions are largely based on the income generated.
 - Unfortunately, most smallholder farmers rarely keep records; subsequently, most decisions are abstract and highly subjective. Due to the abstract nature, smallholder farmers decisions are more often not economically viable.
 - In view of these, there is need to sensitize smallholder farmers on the importance of keeping accurate farm records in making economically viable decisions.

8. GHCP&PHHT: Cost & Income Analysis: Q20 (2/2)

(C) Production & Sales Record

Date	Total Production (kg) (Yield)	Net Production (kg) (sold&consumed)	Price/kg (ksh./kg)	Total income (ksh)
1st Dec	80kg	75kg	35	2,625
5th Dec	323kg	309kg	35	10,815
8th Dec	168kg	160kg	35	5,600
10th Dec	13kg	12kg	35	420
.....
.....
27 th Dec	28kg	25kg	45	1,125
Grand total	868kg	772kg		(C) Gross Income 32,424

(D) Net Income

Gross income (C) - Total Production Cost (A+B) = Net Income

$$\underline{\text{KSH } 32,424} - \underline{\text{KSH } 16,400} = \underline{\text{KSH } 16,024}$$

7. GHCP&PHHT: Cost & Income Analysis: Q20 2/2

(C) Production & Sales Record

Date	Total Production (kg) (Yield)	Net Production (kg) (sold&consumed)	Price/ kg (ksh./kg)	Total income (ksh)
1st Dec	80kg	75kg	35	2,625
5th Dec	323kg	309kg	35	10,815
8th Dec	168kg	160kg	35	5,600
10th Dec	13kg	12kg	35	420
.....
.....
27 th Dec	28kg	25kg	45	1,125
Grand total	868kg	772kg		(C) Gross Income 32,424

(D) Net Income

Gross income (C) - Total Production Cost (A+B) = Net Income

$$\underline{\text{KSH 32,424}} - \underline{\text{KSH 16,400}} = \underline{\text{KSH 16,024}}$$

(C) Production & Sales Record

- Keep records of all the Production & Sales with Date/ Total Production(Yield) (kg)/ Price/kg/ Total income.
- In the last row, sum up all the recorded Total Income (C), which is Gross income

(D) Net Income

- Net income is calculated by

$$\text{Gross income (C)} - \text{Total Production Cost (A+B) (Shown in the previous page)} = \text{Net Income}$$