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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1. Introduction: Background

Handout 3-1 | For Reference

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

**[PART 1: Background Information]**

<table>
<thead>
<tr>
<th>County:</th>
<th>Sub-county:</th>
<th>Date (DD/MM/YYYY):</th>
<th>Group Name:</th>
<th>Tel. No.</th>
<th>Name of Farmer:</th>
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**[PART 2: Horticultural Crops Production Techniques]** Please tick appropriately for "YES" or "NO"

<table>
<thead>
<tr>
<th>Pre to Post Cultivation Stages</th>
<th>Items</th>
<th>Horticultural Techniques Advocated for Adoption</th>
<th>Yes*</th>
<th>No</th>
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<tbody>
<tr>
<td>1 Pre-Cultivation Preparation</td>
<td>Q 1. Do you undertake a market survey to determine the crop(s) to cultivate?</td>
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<td>Q 2. Do you use crop planting calendar(s) to plan production for the next cropping season?</td>
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<td>Q 3. Do you undertake soil testing at least once in two to three years?</td>
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<td>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?</td>
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<td>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 taste, size, and longer shelf life?</td>
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<td>2 Land Preparation</td>
<td>Q 6. Do you use one or more of the following recommended land preparation practices in management of pests &amp; diseases: Soil solarization, timely ploughing, appropriate depth of ploughing, and minimum tillage?</td>
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<td>Q 7. Do you incorporate crops residues at least two months before planting to enhance recycling of nutrients?</td>
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<td>Q 8. Do you incorporate compost/manure or organic fertilizer as a basal application at least 1-2 weeks before planting?</td>
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<tr>
<td>3 Crop Establishment (Planting/Transplanting)</td>
<td>Q 9. Do you use recommended practices in raising seedlings or use seedlings raised from registered nursery(s)?</td>
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<td>Q 10. Do you use recommended planting/transplanting spacing?</td>
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<td>Q 11. Do you plant/transplant using recommended fertilizer application rates?</td>
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Fig. 1: A check list of the GHCP&PHHT 20
1. Introduction: Background

- 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.

Fig. 1: A check list of the GHCP&PHHT 20 (G20)
2. GHCP&PHHT: Pre-Cultivation Preparation: Q1

Farmers conducting a market survey
2. GHCP&PHHT: Pre-Cultivation Preparation: Q1 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.

Farmers conducting a market survey
## 2. GHCP&PHHT: Pre-Cultivation Preparation: Q2

### CROP PLANTING CALENDER

<table>
<thead>
<tr>
<th>Month</th>
<th>Land Preparation</th>
<th>Transplant</th>
<th>Weed, pest &amp; disease control</th>
<th>Harvesting</th>
<th>Yields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul</td>
<td></td>
<td>30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aug</td>
<td></td>
<td>after seed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep</td>
<td></td>
<td>germination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct</td>
<td></td>
<td>30 – 40 cm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov</td>
<td></td>
<td>between rows &amp; 10 – 15 cm between plants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Jan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb</td>
<td></td>
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</tbody>
</table>

- **Manure application**: 2 – 3 kg per m²
- **Sowing nursery**
- **Spacing**: 30 – 40 cm between rows & 10 – 15 cm between plants
- **Fertilizer application**: 80 kg DAP per acre
- **Top-dressing**: 80 g CAN per acre
- **Harvesting**: 60 days after direct seeding/30 days after transplanting
- **Yields**: 4,000 – 8,000 kg per acre

**Peak demand for Black Nightshade**

### A Black Nightshade Planting Calendar
2. GHCP&PHHT: Pre-Cultivation Preparation: Q2 Crop Planting Calendar

![Crop 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

- 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

Collecting soil samples
2. GHCP&PHHT: Pre-Cultivation Preparation: Q4

Manure preparation through composting
2. GHCP&PHHT: Pre-Cultivation Preparation: Q4 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

Assorted quality seeds

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

- 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)
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.

Land preparation using a hoe (Jembe)
3. GHCP&PHHT: Land Preparation: Q7

Incorporation of crop residues
Incorporation of Crop Residues

“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
**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

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**Basal application of organic manure/fertilizer in the field**
4. GHCP&PHHT: Crop Establishment: Q9

Nursery of leafy vegetables
4. GHCP&PHHT: Crop Establishment: Q9

Raising Seedlings

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

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
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 (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
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-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 established 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

Top-dressed Cabbages
5. GHCP&PHHT: Crop Management: Q15

An example of a Crop Rotation

- **Leguminosae & Malvaceae**
  - Garden Peas
  - Snow Peas
  - Broad Bean
  - Okra

- **Alliaceae**
  - Bulb Onion
  - Spring Onion
  - Leek
  - Garlic

- **Brassicaceae**
  - Cabbage
  - Kale
  - Broccoli
  - Cauliflower
  - Radish

- **Solanaceae, Umbelliferae, & Amaranthaceae**
  - Tomato
  - Sweet Pepper
  - Egg Plant
  - Beet Root
  - Carrot
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 repellant 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.

An example of a Crop Rotation:

- **Alliacea**
  - Bulb Onion
  - Spring Onion
  - Leek
  - Garlic

- **Brassicaceae**
  - Cabbage
  - Kale
  - Broccoli
  - Cauliflower
  - Radish

- **Solanaceae, Umbelliferae, & Amaranthaceae**
  - Tomato
  - Sweet Pepper
  - Egg Plant
  - Beet Root
  - Carrot

- **Leguminosae & Malvaceae**
  - Garden Peas
  - Snow Peas
  - Broad Bean
  - Okra

- **Brassicaceae**
  - Cabbage
  - Kale
  - Broccoli
  - Cauliflower
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  - Tomato
  - Sweet Pepper
  - Egg Plant
  - Beet Root
  - Carrot

- **Leguminosae & Malvaceae**
  - Garden Peas
  - Snow Peas
  - Broad Bean
  - Okra
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

“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.

Putting on protective clothing before application of pesticide

Photos: SHEP PLUS
6. GHCP&PHHT: Harvest: Q17

Harvesting Cabbages
6. GHCP&PHHT: Harvest : Q17

Harvesting Indices

- 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

Photo: © Victor Omari HCD 2019
“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

<table>
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<th>Type of input/any other remarks</th>
<th>Quantity</th>
<th>Cost (Ksh)</th>
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<tbody>
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<td>1st Oct</td>
<td>Tomato Seeds (Cal J)</td>
<td>75g</td>
<td>500</td>
</tr>
<tr>
<td>3rd Oct</td>
<td>Fertilizer (DAP)</td>
<td>50kg</td>
<td>2,000</td>
</tr>
<tr>
<td>12th Nov</td>
<td>Pesticide (Duduthrin)</td>
<td>200ml</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5th Dec</td>
<td>Crates</td>
<td>20</td>
<td>120</td>
</tr>
</tbody>
</table>

Grand Total of Input & Other costs (A) 10,700

(B) Labour cost (should include family labour)

<table>
<thead>
<tr>
<th>Date</th>
<th>Farm activity</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd Oct</td>
<td>Land Preparation</td>
<td>250</td>
</tr>
<tr>
<td>6th Oct</td>
<td>Nursery Establishment</td>
<td>1,100</td>
</tr>
<tr>
<td>23rd Oct</td>
<td>Transplanting</td>
<td>600</td>
</tr>
<tr>
<td>27th Dec</td>
<td>Weeding</td>
<td>300</td>
</tr>
<tr>
<td>19th Dec</td>
<td>Harvesting</td>
<td>1,300</td>
</tr>
<tr>
<td>20th Dec</td>
<td>Transportation</td>
<td>350</td>
</tr>
</tbody>
</table>

Grand Total of Labour cost (B) 5,700

Grand Total of Input & Other costs (A) + Grand Total of Labour cost (B) = Total Production Cost (A+B)

10,700 + 5,700 = 16,400
7. GHCP&PHHT: Cost & Income Analysis: Q20 Farm Records (1/2)

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.

(A) Input cost & other costs
- 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 (should include family labour)
- 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
8. GHCP&PHHT: Cost & Income Analysis: Q20 (2/2)

(C) Production & Sales Record

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

(D) Net Income

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

KSH 32,424 - KSH 16,400 = KSH 16,024
7. GHCP&PHHT: Cost & Income Analysis: Q20 2/2

(C) Production & Sales Record

<table>
<thead>
<tr>
<th>Date</th>
<th>Total Production (kg)</th>
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<tr>
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<td><strong>772kg</strong></td>
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<td></td>
</tr>
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(C) Gross Income 32,424

(D) Net Income

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

KSH 32,424 - KSH 16,400 = 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
  Gross income (C) – Total Production Cost (A+B) (Shown in the previous page) = Net Income