#### **Practical Manual**

## TROPICAL AND SUBTROPICAL FRUITS HFS 104 3(2+1)

For Undergraduate Horticulture students

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Jhansi - 284003

#### **SYLLABUS**

**Practical:** Description and identification of varieties based on flower and fruit morphology in above crops. Training and pruning of grapes, mango, guava and citrus. Selection of site and planting system, pre-treatment of banana suckers, desuckering in banana, sex forms in papaya. Use of plastics in fruit production. Visit to commercial orchards and diagnosis of maladies. Manure and fertilizer application including bio-fertilizer in fruit crops, preparation and application of growth regulators in banana, grapes and mango. Seed production in papaya, latex extraction and preparation of crude papain. Ripening of fruits, grading and packaging, production economics for tropical and sub-tropical fruits. Mapping of arid and semi-arid zones of India. Botanical description and identification of ber, fig, jamun, pomegranate, carissa, phalsa, wood apple, West Indian cherry, tamarind, aonla, bael and Annona.

Name of Student:

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| Batch                                    |
| Session                                  |
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| CERTIFICATE                              |
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| ID No has completed the practical course |
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| B. Sc (Hons) Agriculture/Horticulture    |

semester in the year ..... in the respective lab/field of college.

Date: Course Teacher

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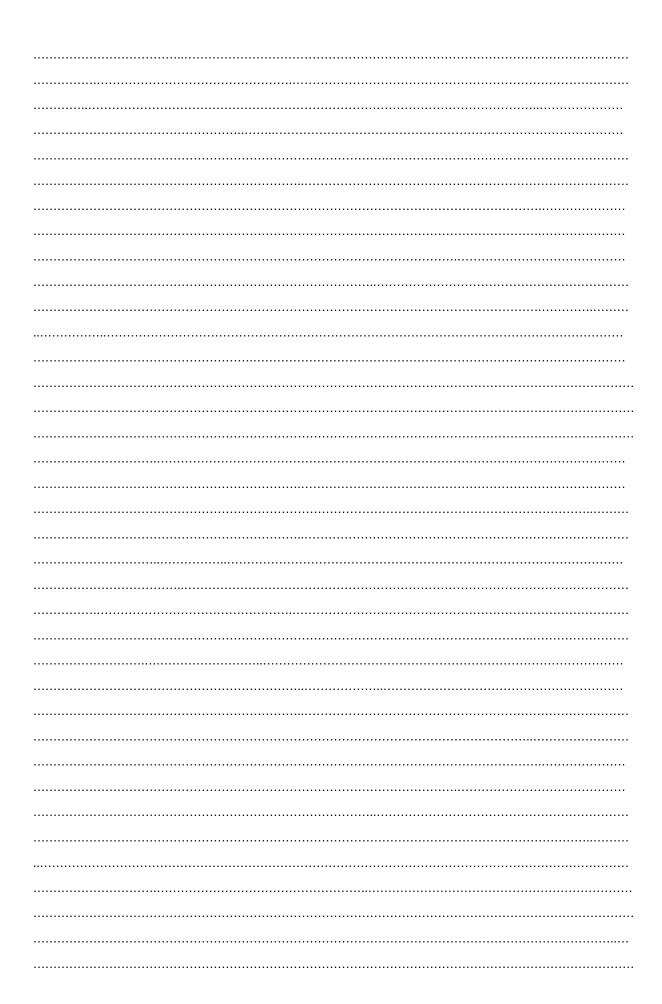
| SI No. | Date | Exercise  | Page<br>No. | Remarks |
|--------|------|---|-------------|---------|
| 1      |      | Description and identification of Tropical and subtropical Fruits                           |             |         |
| 2      |      | Training and Pruning of Tropical and Sub-tropical fruits                                    |             |         |
| 3      |      | Bearing Habit of Tropical and Sub-tropical Fruit Crops                                      |             |         |
| 4      |      | Propagation, Planting and Planting Density of Pineapple                                     |             |         |
| 5      |      | Selection of site and planting system, pre-treatment and intercultural operation in banana. |             |         |
| 6      |      | Pretreatment of banana suckers  |             |         |
| 7      |      | Desuckering of Banana   |             |         |
| 8      |      | Preparation and Application of Growth Regulators  |             |         |
| 9      |      | Preparation of Fertilizer Mixtures and Field Application                                    |             |         |
| 10     |      | Methods of Biofertilizer application in fruit crops   |             |         |
| 11     |      | Use of plastic mulches in fruit orchard   |             |         |
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| 13     |      | Latex extraction of papaya fruit and preparation of crude papain                            |             |         |
| 14     |      | Papaya seed production: Seed extraction and drying  |             |         |
| 15     |      | Production economics for commercial cultivation of Mango, and Banana                        |             |         |
| 16     |      | Maturity Standard of Fruits   |             |         |
| 17     |      | Mapping of arid and semi-arid zones of India  |             |         |
| 18     |      | Visit to an Orchard and diagnosis of maladies in fruit crops                                |             |         |

#### Objective: Description and identification of Tropical and subtropical Fruits

| S.<br>No | Fruit crops | Parameters  | Remarks |
|----------|-------------|---|---------|
| 1        | Mango       | Inflorescence shape (Conical, Pyramidal, broadly pyramidal) |         |
|          |             | Inflorescence colour  |         |
|          |             | Position of flower/bearing habit                            |         |
|          |             | Time of flowering   |         |
|          |             | Fruit Shape   |         |
|          |             | Fruit colour at maturity                                    |         |
|          |             | Fruit length  |         |
|          |             | Fruit breadth   |         |
|          |             | Time of fruit maturity                                      |         |
| 2        | Banana      | Inflorescence shape (Conical, Pyramidal, Broadly pyramidal) |         |
|          |             | Inflorescence colour  |         |
|          |             | Position of flower/bearing habit                            |         |
|          |             | Time of flowering   |         |
|          |             | Fruit Shape   |         |
|          |             | Fruit colour at maturity                                    |         |
|          |             | Fruit length  |         |
|          |             | Fruit breadth   |         |
|          |             | Time of fruit maturity                                      |         |
| 3        | Grapes      | Inflorescence shape (Conical, Pyramidal, Broadly pyramidal) |         |
|          |             | Inflorescence colour  |         |
|          |             | Position of flower/bearing habit                            |         |
|          |             | Time of flowering   |         |
|          |             | Fruit Shape   |         |
|          |             | Fruit colour at maturity                                    |         |
|          |             | Fruit length  |         |
|          |             | Fruit breadth   |         |

|   |        | Time of fruit maturity                                      |
|---|--------|---|
| 4 | Guava  | Inflorescence shape (Conical, Pyramidal, Broadly pyramidal) |
|   |        | Inflorescence colour  |
|   |        | Position of flower/bearing habit                            |
|   |        | Time of flowering   |
|   |        | Fruit Shape   |
|   |        | Fruit colour at maturity                                    |
|   |        | Fruit length  |
|   |        | Fruit breadth   |
|   |        | Time of fruit maturity                                      |
| 5 | Ber    | Inflorescence shape (Conical, Pyramidal, Broadly pyramidal) |
|   |        | Inflorescence colour  |
|   |        | Position of flower/bearing habit                            |
|   |        | Time of flowering   |
|   |        | Fruit Shape   |
|   |        | Fruit colour at maturity                                    |
|   |        | Fruit length  |
|   |        | Fruit breadth   |
|   |        | Time of fruit maturity                                      |
| 6 | Citrus | Inflorescence shape (Conical, Pyramidal, Broadly pyramidal) |
|   |        | Inflorescence colour  |
|   |        | Position of flower/bearing habit                            |
|   |        | Time of flowering   |
|   |        | Fruit Shape   |
|   |        | Fruit colour at maturity                                    |
|   |        | Fruit length  |
|   |        | Fruit breadth   |
|   |        | Time of fruit maturity                                      |
|   |        |   |

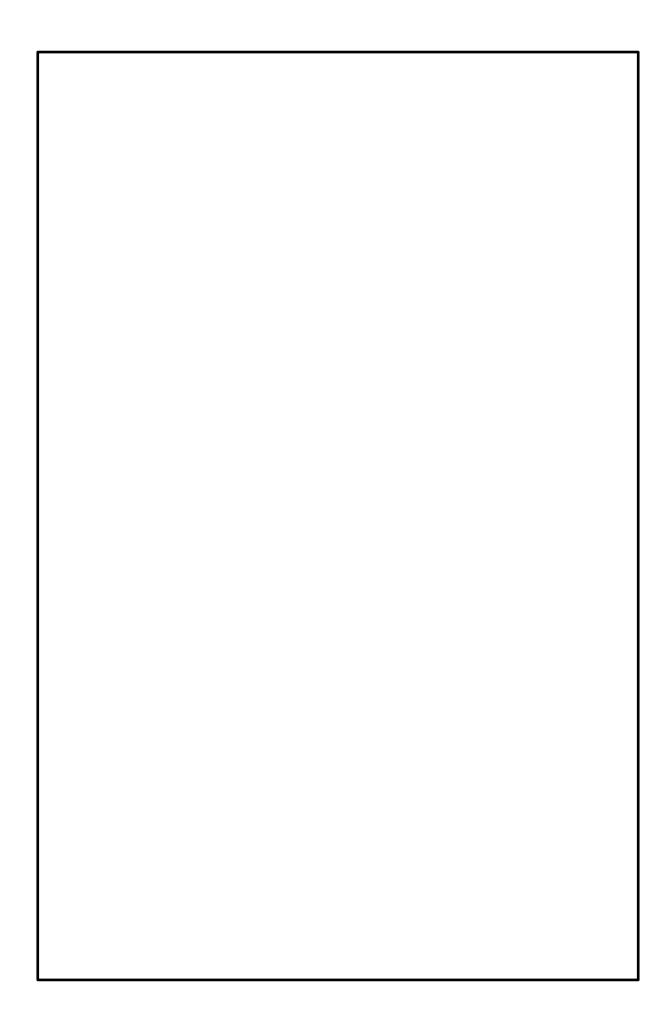
| Objective: Training and Pruning of Tropical and Sub-tropical fruits  Materials required: |  |  |  |  |
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|  |  |  |  |  |
| Methods of training:   |  |  |  |  |
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| Procedures:  |  |  |  |  |
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| Assignment: Practice the procedures and draw sketches. |  |
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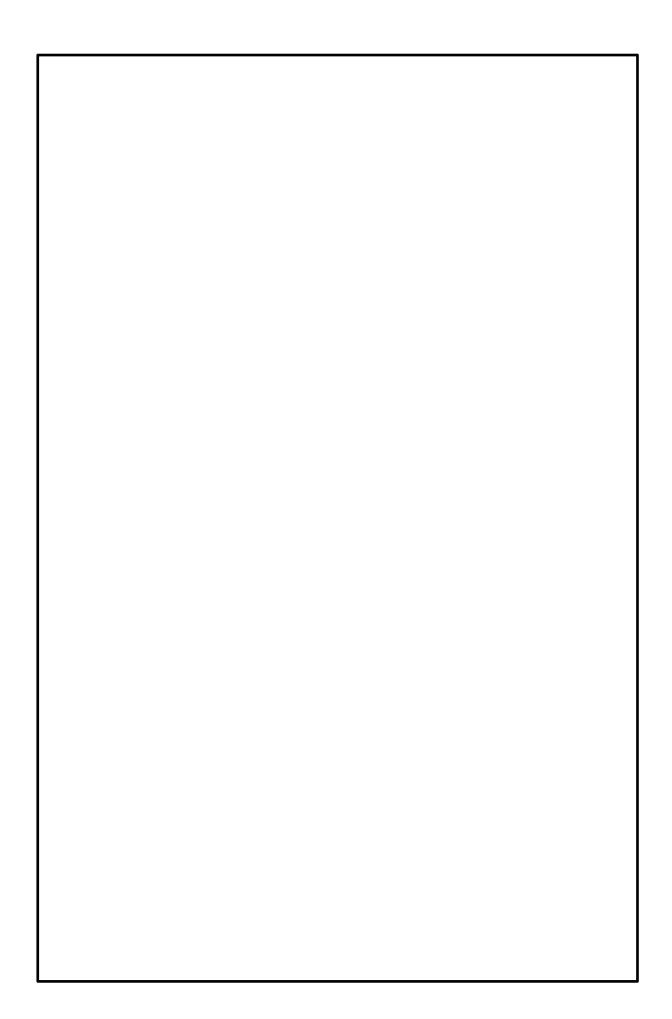


| Objective: Bearing Habit of Tropical and Sub-tropical Fruit Crops |                   |                           |                                |                                   |         |  |
|---|-------------------|---------------------------|--------------------------------|-----------------------------------|---------|--|
| Materials required:   |                   |                           |                                |                                   |         |  |
|   |                   |                           |                                |                                   |         |  |
|   |                   |                           |                                |                                   |         |  |
| Proc  | edure:            |                           |                                |                                   |         |  |
|   |                   |                           |                                |                                   |         |  |
|   |                   |                           |                                |                                   |         |  |
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|   |                   |                           |                                |                                   |         |  |
|   |                   |                           |                                | of studied bearing habit          |         |  |
| S.<br>No  | Name of the crops | Position of flower on the | Nature of shoot bearing flower | Flower borne in cluster/ solitary | Remarks |  |
| 110   | the crops         | shoot                     | bearing nower                  |                                   |         |  |
|   |                   |                           |                                |                                   |         |  |
|   |                   |                           |                                |                                   |         |  |
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| Objective: Propagation, Planting and Planting Density of Pineapple |  |  |  |  |
|--|--|--|--|--|
| Materials required:  |  |  |  |  |
|  |  |  |  |  |
| Time of planting:  |  |  |  |  |
| Time of planting:  |  |  |  |  |
| Pre-treatment of Planting Material:                                |  |  |  |  |
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| Planting System:   |  |  |  |  |
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| Procedure:   |  |  |  |  |
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Assignment:

1. Draw the different types of planting materials used in propagation of pineapple



#### 2. Calculate the planting density (Per hectare) as details below:

| Plant to plant | Row to Row | Between double row | Planting density |
|----------------|------------|--------------------|------------------|
| 30             | 60         | 90                 |                  |
| 25             | 60         | 90                 |                  |
| 25             | 60         | 75                 |                  |
| 25             | 35         | 90                 |                  |

#### **Double Row System:**

If, the plant to plant distance is 25 cm, row to row distance is 35 cm and bed to bed distance is 90 cm.)

No of plants / ha = 
$$\frac{2 \times 10000}{0.25 \times (0.35 + 0.90)}$$

**No of plants / ha =** 64000

| 3. | Draw a lav | vout plan | for planting | of pinear | ple at densit | y of 64000/ha |
|----|------------|-----------|--------------|-----------|---------------|---------------|
| •• |            | ,         |              | ,         | P.O. W. W. W  | ,             |

## Objective: Selection of site and planting system, pre-treatment and intercultural operation in banana.

| Materials required:  |
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| Selection of Site:   |
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| Procedure of field preparation:  |
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| Planting Distance:                     |
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| Procedure of Pre-treatment of suckers: |
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| System of Planting:                    |
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| Method of Planting: |
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| Procedure | e of intercult  | ural operatior                                  | 1: |      |      |
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|           |                 |   |    | <br> | <br> |
| Assignme  | ent: Follow the | v the procedure and present with a neat sketch. |    |      |      |
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| Objective: Pretreatment of banana suckers.               |         |
|--|---------|
| Materials required:                                      |         |
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| Procedure:   |         |
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| Assignment: Follow the procedure and present with a neat | sketch. |
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| Objective: De-suckering of Banana |
|-----------------------------------|
| Materials required:               |
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| Procedure:                        |
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**Assignment:** Follow the procedure through manual process in field condition.

| Objective: Preparation and Application of Growth Regulators |   |
|---|---|
| Materials Required:   |   |
|   |   |
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| Preparation of growth regulators                            |   |
| Dust form:  |   |
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| Solution form:  |   |
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| Solvents 1 | for dissolving          | plant growth | regulators |
|------------|-------------------------|--------------|------------|
| Mama of    | البينة منت مالمتين منتب | -4           |            |

| Name of growth regulator                               | Solvent                            |
|--|------------------------------------|
| Indole Acetic Acid (IAA), Indole Butyric Acid (IBA), 4 | Ethyl alcohol, Methanol, Potassium |
| CPA, NAA   | hydroxide, Sodium hydroxide        |
| 2, 4-D and 2, 4,5-T                                    | Water                              |
| Gibberellic Acid (GA3), 6-Benzyl Adenine, Benzyl Amino | Ethanol or Methanol, 0.1 N HCL     |
| purine, Kinetin 2 ip                                   |                                    |

| Procedure:   |   |
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| <b>Example:</b> Before preparation, the following aspects should be known-active ingredients or strength of puchemical that is mentioned in the label of the pack, the amount of chemical required for the desired strength a volume are calculated by the following formula.                      |   |
| V <sub>1</sub> S <sub>1</sub> = V <sub>2</sub> S <sub>2</sub> Where V <sub>1</sub> = chemical required.  S <sub>1</sub> = strength of chemicals/hormone.  V <sub>2</sub> = water or powder required.  S <sub>2</sub> = concentration or strength of chemical/ hormone required.  [1% = 10,000 ppm] |   |
| Solved Problem:  |   |
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| Objective: Preparation of Fertilizer Mixtures and Field Application |
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| Materials required:   |
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| Method of Application:  |
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| Precautions:  |
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| roblems: Practice the job on the field.  Objective: Methods of Biofertilizer application in fruit c | Exercise No. 10 |
|---|-----------------|
| aterials required:  |                 |
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| pplication method:  |                 |
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**Assignment:** Write in brief the method of biofertilizer application you have practiced in field.

| Objective: Use of plastic mulches in fruit orchard  Materials required: |  |  |  |
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| Procedure:  |  |  |  |
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| Objective: Sex forms of Papaya |
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| Materials required:            |
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| Procedure:                     |
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#### **Different sex expression**

| S. No | Туре                         | Characters |
|-------|------------------------------|------------|
| 1     | Pistillate                   |            |
| 2     | Staminate                    |            |
| 3     | Hermaphrodite                |            |
| 4     | Reduced elongate (Unisexual) |            |
| 5     | Elongate                     |            |
| 6     | Pentandria                   |            |
| 7     | Carpelloid                   |            |

| / Carpelloid                    |  |
|---------------------------------|--|
| Assignment: Study the different | flower types of papaya and draw the neat sketches. |
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| Objective: Latex extraction of papaya fruit and Preparation of crude papain  Materials required: |  |  |
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| Procedure:   |  |  |
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| <b>bservation</b> Cultivars of |      |       |         |     |   |         |             |
|--------------------------------|------|-------|---------|-----|---|---------|-------------|
| Time                           |      |       | of      |     |   |         | collection  |
| Season                         |      |       | of      |     |   |         | collection  |
| Quantity                       | of   | fresh |         |     | 1 | fruit   | (g)         |
| Fruit                          | size | -     | · ·     | and |   | breadth | (cm)        |
| Maturity                       | du   | ring  | lancing |     |   | (days   | old)        |
|                                | _    | the   | fruit   |     | _ | oval/o  | blong/round |
|                                |      |       |         |     |   |         |             |
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# Preparation of crude papain Materials required: Procedure: Observation Time taken for sun drying: ..... Time required for oven drying: ..... Colour of dried papain: Quality of dry papain/fruit: Texture of papain (crisp and thick):

Assignment: Dry the latex in sun / oven

#### **EXERCISE 14**

| Objective: Papaya seed production: Seed            | extraction and drying |  |
|--|-----------------------|--|
| Materials required:                                |                       |  |
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| Procedure:   |                       |  |
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| Observation  |                       |  |
| Observation  | Damanka               |  |
| Parameters Numbers of seeds per fruit              | Remarks               |  |
| Numbers of seeds per fruit No. of seeds per 100 gm |                       |  |
| Colour of seed                                     |                       |  |

Assignment: Follow the steps involved in seed extraction and drying

### Objective: Production economics for commercial cultivation of Mango, and Banana

Items for calculating the cost of cultivation of Banana for 1 ha. area

| S.<br>No. | Component   | Proposed Expenditure |
|-----------|---|----------------------|
| 1.        | Plantation Expenses   |                      |
|           | Cost of planting material (Suckers and tissue culture plants)                                 |                      |
|           | Cost of Manures & fertilizers   |                      |
|           | FYM   |                      |
|           | Nitrogen  |                      |
|           | Phosphorus  |                      |
|           | Potassium   |                      |
|           | FeSO <sub>4</sub>   |                      |
|           | CuSO <sub>4</sub>   |                      |
|           | FeSO <sub>4</sub>   |                      |
|           | Cost of any others nutrients and plant growth regulators                                      |                      |
|           | Cost of Insecticides & pesticides   |                      |
|           | Cost of labour for application of manures, fertilizers and pesticides. Weeding and harvesting |                      |
|           | Others, if any, (Power)   |                      |
| 2.        | Irrigation  |                      |
|           | Tube-well/submersible pump  |                      |
|           | Cost of Pipeline  |                      |
|           | Others, if any, please specify  |                      |
| 3.        | Cost of Drip/Sprinkler  |                      |
| 4.        | Infrastructure  |                      |
|           | Store   |                      |
|           | Labour shed & Pump house  |                      |
|           | Farm Equipment  |                      |
| 5.        | Land Development  |                      |
|           | Soil Leveling   |                      |
|           | Digging   |                      |
|           | Fencing   |                      |
|           | Others, if any, please specify  |                      |
|           | Grand Total   |                      |

| Total expenditure     | Net income = gross income – expenditure     |
|-----------------------|---|
| Total yield of Banana | •   |
| Sold @                | Net income growing one ha. Banana will be   |
| -                     | Benefit cost ratio: Net income / total cost |

#### Items for calculating the cost of cultivation of Mango for 1 ha. area

| SI. | Component  | Proposed Expenditure |  |  |
|-----|--|----------------------|--|--|
| No. |  |                      |  |  |
| 1.  | Plantation Expenses  |                      |  |  |
|     | Cost of planting material (Based on planting density)                  |                      |  |  |
|     | Cost of Manures & fertilizers  |                      |  |  |
|     | FYM  |                      |  |  |
|     | Nitrogen   |                      |  |  |
|     | Phosphorus   |                      |  |  |
|     | Potassium  |                      |  |  |
|     | Cost of any others nutrients and plant growth regulators               |                      |  |  |
|     | Cost of Insecticides & pesticides                                      |                      |  |  |
|     | Cost of labour for application of manures, fertilizers and pesticides. |                      |  |  |
|     | Others, if any, (like Training, pruning and weeding and harvesting)    |                      |  |  |
| 2.  | Irrigation   |                      |  |  |
|     | Tube-well/submersible pump   |                      |  |  |
|     | Cost of Pipeline   |                      |  |  |
|     | Others, if any, please specify   |                      |  |  |
| 3.  | Cost of Drip/Sprinkler   |                      |  |  |
| 4.  | Infrastructure   |                      |  |  |
|     | Store  |                      |  |  |
|     | Labour shed & Pump house   |                      |  |  |
|     | Farm Equipment   |                      |  |  |
| 5.  | Land Development   |                      |  |  |
|     | Soil Leveling (Hiring tractor for plowing and leveling)                |                      |  |  |
|     | Digging (Hiring JCB for pit digging)                                   |                      |  |  |
|     | Fencing (permanent/temporary)  |                      |  |  |
|     | Others, if any, please specify   |                      |  |  |
|     | Grand Total  |                      |  |  |

|  | Fencing (permanent/temporary)  |   |
|--|--------------------------------|---|
|  | Others, if any, please specify |   |
|  | Grand Total                    |   |
| Total expenditure Total yield of Mango |                                | Net income = gross income – expenditure   |
|  |                                | Net income growing one ha. Mango will be  Benefit cost ratio: Net income / total cost |
| Cond                                   | clusion:                       |   |
|  |                                |   |
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.....

#### The major components of the model are:

- **Land Development:** This is the labour cost of shaping and dressing the land site.
- **Fencing:** It is necessary to safeguard the orchard by a barbed wire fencing.
- ➤ Irrigation Infra-structure: For effective working with drip irrigation system, it is necessary to install a bore well with diesel/electric pumpset and motor. This is post cost of tube-well.
- **Drip Irrigation:** This is average cost of one acre drip system for apple inclusive of the cost of fertigation equipment. The actual cost will vary depending on location, plant population and plot geometry.
- ➤ **Implements:** For investment on improved manually operated essential implements a provision of another Rs.15 thousand is included.
- **Building and Storage:** A one acre orchard would require minimally a labour shed and a store-cum grading/packing room & pump house.

| Objective: Maturity Standard of Fruits |
|--|
| Materials required:                    |
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| Maturity Indices of fruits:            |
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#### A. Fruit maturity standard

Study the development stages of seasonal fruits and record your observation in the following table.

#### Observe the stage of fruit maturity and record

| S. | Fruit's name | Stage of         | Fruit size    | Colour |       |      | Taste / | TSS |
|----|--------------|------------------|---------------|--------|-------|------|---------|-----|
| No |              | development      | weight/volume | Fruit  | Flesh | Seed | Flavour |     |
| 1. |              | Underdeveloped   |               |        |       |      |         |     |
|    |              | Fully developed  |               |        |       |      |         |     |
|    |              | Harvest maturity |               |        |       |      |         |     |
| 2  |              | Underdeveloped   |               |        |       |      |         |     |
|    |              | Fully developed  |               |        |       |      |         |     |
|    |              | Harvest maturity |               |        |       |      |         |     |
| 3  |              | Underdeveloped   |               |        |       |      |         |     |
|    |              | Fully developed  |               |        |       |      |         |     |
|    |              | Harvest maturity |               |        |       |      |         |     |
| 4  |              | Underdeveloped   |               |        |       |      |         |     |
|    |              | Fully developed  |               |        |       |      |         |     |
|    |              | Harvest maturity |               |        |       |      |         |     |
| 5  |              | Underdeveloped   |               |        |       |      |         |     |
|    |              | Fully developed  |               |        |       |      |         |     |
|    |              | Harvest maturity |               |        |       |      |         |     |
| 6  |              | Underdeveloped   |               |        |       |      |         |     |
|    |              | Fully developed  |               |        |       |      |         |     |
|    |              | Harvest maturity |               |        |       |      |         |     |
| 7  |              | Underdeveloped   |               |        |       |      |         |     |
|    |              | Fully developed  |               |        |       |      |         |     |
|    |              | Harvest maturity |               |        |       |      |         |     |
| 8  |              | Underdeveloped   |               |        |       |      |         |     |
|    |              | Fully developed  |               |        |       |      |         |     |
|    |              | Harvest maturity |               |        |       |      |         |     |
| 9  |              | Underdeveloped   |               |        |       |      |         |     |
|    |              | Fully developed  |               |        |       |      |         |     |
|    |              | Harvest maturity |               |        |       |      |         |     |
| 10 |              | Underdeveloped   |               |        |       |      |         |     |
|    |              | Fully developed  |               |        |       |      |         |     |
|    |              | Harvest maturity |               |        |       |      |         |     |

#### B. Harvesting, handling, grading and packing

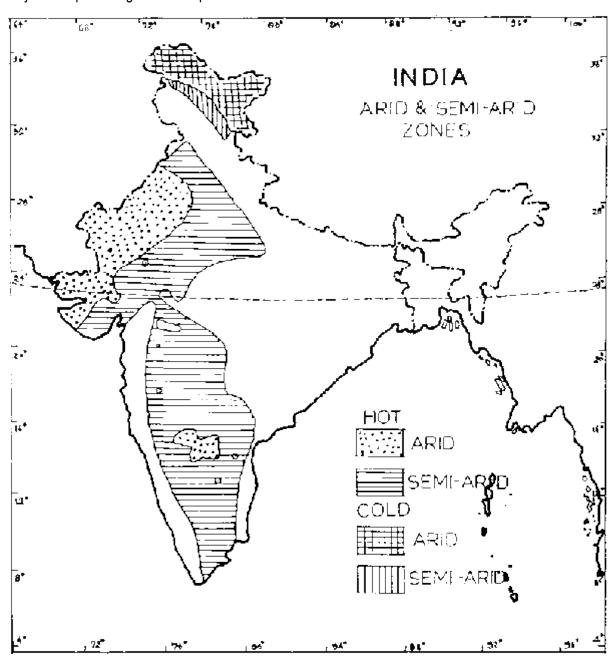
Students should participate in harvesting, handling, grading and packing of the seasonal fruits available at the fruits orchard and record their observation.

#### Observation in details of harvesting and postharvest handling of fruits

| S. | Name of the | Harvesting  | Grading method | Packing materials | Other       |
|----|-------------|-------------|----------------|-------------------|-------------|
| No | fruits      | device used | used           | used              | observation |
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| Objective: Mapping of arid and semi-arid zones of India  Materials required: |
|--|
| List of major fruits grown in arid and semi-arid region:                     |
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|  |
| State wise description in arid and semi-arid regions in India:               |
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**Assignment:** Draw sketches of Indian political map and mansion arid and semi-arid regions. Point out major fruits producing areas and production.



#### **EXERCISE 18**

| Objective: Visit to an Orchard and diagnosis of maladies in fruit crops  Materials required: |           |                                 |  |  |  |  |  |  |
|--|-----------|---------------------------------|--|--|--|--|--|--|
|  |           |                                 |  |  |  |  |  |  |
| Procedure of obs   | ervation: |                                 |  |  |  |  |  |  |
|  |           |                                 |  |  |  |  |  |  |
| Observation  |           |                                 |  |  |  |  |  |  |
| Type of malady   | Symptoms  | Suggestion for remedial measure |  |  |  |  |  |  |
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#### **APPENDICES**

#### **NUTRIENT CONTENT OF ORGANIC MANURES**

| Organic Manure                          | N %   | P <sub>2</sub> O <sub>5</sub> % | K₂O % |
|---|-------|---------------------------------|-------|
| Farmyard manure                         | 0.50  | 0.25                            | 0.50  |
| Cattle dung                             | 0.40  | 0.20                            | 0.17  |
| Poultry manure                          | 3.03  | 0.63                            | 1.40  |
| Vermicompost                            | 3.00  | 1.00                            | 1.50  |
| Rural compost                           | 0.75  | 0.20                            | 0.50  |
| Urban compost                           | 1.75  | 1.00                            | 1.50  |
| Castor cake                             | 4.37  | 1.85                            | 1.39  |
| Coconut cake                            | 3.00  | 1.80                            | 1.90  |
| Neem cake                               | 5.22  | 1.08                            | 1.48  |
| Blood meal                              | 12.00 | 2.00                            | 1.00  |
| Groundnut cake                          | 7.30  | 1.50                            | 1.30  |
| Pressmud                                | 2.10  | 4.40                            | 0.80  |
| Safflower cake                          | 4.8   | 1.4                             | 1.2   |
| Sesamum cake                            | 6.2   | 2.0                             | 1.2   |
| Fish mean, fish manuring and fish guano | 4.0   | 3.0                             | 0.3   |
| Bono mean (Raw)                         | 3.0   | 20.0                            | =     |
| Bone mean (Steamed)                     | 1.0   | 25.0                            | -     |
| Settled sludge (Dry)                    | 2.0   | 1.0                             | 0.4   |
| Night soil                              | 1.2   | 0.8                             | 0.4   |
| Human urine                             | 1.0   | 0.1                             | 0.2   |
| Cattle dung and urine mixed             | 0.60  | 0.15                            | 0.45  |
| Horse dung and urine mixed              | 0.70  | 0.25                            | 0.55  |
| Sheep dung and urine mixed              | 0.95  | 0.35                            | 1.00  |

#### **COMPOSITION OF INORGANIC FERTILIZERS**

| Fertilizers                | N %  | P <sub>2</sub> O <sub>5</sub> % | K₂O % | Sulphur | Calcium |
|----------------------------|------|---------------------------------|-------|---------|---------|
| Ammonium nitrate           | 35   |                                 |       | _       |         |
| Calcium ammonium nitrate   | 26   |                                 |       |         |         |
| Ammonium sulphate nitrate  | 26   |                                 |       | 12.1    |         |
| Sodium nitrate             | 15.6 | -                               | -     |         |         |
| Calcium nitrate            | 15.5 | -                               | -     |         | 19.5    |
| Potassium nitrate          | 13.0 | -                               | -     |         |         |
| Ammonium sulphate          | 20.6 |                                 |       | 24      |         |
| Ammonium chloride          | 26.0 |                                 |       |         |         |
| Anhydrous ammonia          | 82.0 | -                               | 36.4  |         |         |
| Urea                       | 46   | -                               | -     |         |         |
| Calcium cyanamide          | 20.6 |                                 |       |         |         |
| SSP                        | -    | 16                              | -     |         |         |
| Double SP                  | -    | 32                              | -     |         |         |
| Triple SP                  | -    | 46-48                           | -     |         |         |
| Diammonium Phosphate (DAP) | 18   | 46                              | -     |         |         |
| Potassium chloride         |      |                                 | 60    |         |         |
| Potassium sulphate         |      |                                 | 48    |         |         |
| Calcium Chloride           |      |                                 |       |         | 15      |