

3. FARM ASSISTANT

1. INTRODUCTION

The required vocational education and training in farm assistant is intended to be imparted through three modules covering the major areas of agriculture, namely (1) crop husbandry which deals with the cultivation of cereals, millets, pulses, oilseeds, commercial crops, vegetables and fruits (2) soil science and (3) plant protection which deals with pests, disease and weed management in different crops, spread over a period of 9 months. It is expected that the training will provide the latest knowledge of all important field and horticultural crops and the trainee fit for any employment opportunities in field management, suggesting suitable control measures for pest, disease, weed and nutritional deficiencies in any field and horticultural crops. He / She is useful in any soil testing labs for carrying out the tests and suggest suitable fertilizers recommendations.

2. OBJECTIVES OF THE COURSE

- ❖ To impart basic techniques in the cultivation of field and horticultural crops.
- ❖ To provide technical skills to the students to establish and manage a small commercial agricultural enterprise.
- ❖ To develop all necessary skills in practical field.
- ❖ To prepare students for self-employment and for wage employment in agricultural enterprise.

3. SKILLS TO BE PROVIDED

- ❖ Identification of field problems – nature and extent.
- ❖ Identification of crops and varieties.
- ❖ Acquaintance with package of practices on farm.
- ❖ Identification of pests and diseases.
- ❖ Operation and maintenance of plant protection equipment.
- ❖ To acquaint the students scientifically to maintain the soil health by proper soil testing fertilizers recommendations.

4. EMPLOYMENT OPPORTUNITIES

A. Wage Employment

- ❖ Field assistant / farm assistant / field man / agriculture supervisor /gram sevak / village assistant.
- ❖ Field investigator.
- ❖ Lab assistant in central and state governments, agricultural universities, research institutions, fertilizers and pesticide industries and private organisation.
- ❖ Soil Conservation assistant.
- ❖ Agro-service assistant.

B. Self Employment

- ❖ Agro-input supplier.
- ❖ Crop producer
- ❖ Contract Farming
- ❖ Soil Analyzer
- ❖ Agri-service Contractor
- ❖ Self-employment as service centres catering to cluster of villages and assisting farmers in plant protection work as “Kisan Mitra”.

5. Schemes Of Instruction Per Module

Module	Theory		On Job Training		Total	
	Hours	Weightage	Hours	Weightage	Hours	Weightage
I	72	30	216	70	288	100
Total	72	30	216	70	288	100

Schemes Of Instruction Per Week

Module	Theory	On the Job Training	Total
Modules I/II/III	6 Hours	18 Hours	24 Hours

6. SYLLABUS

**MODULE – I
CROP HUSBANDRY**

THEORY:**72 HOURS**

S.No.	Major Topics	Number of Hours
1.	Introduction	03
2.	Cereals	04
3.	Millets	04
4.	Pulses	11
5.	Oil Seeds	15
6.	Commercial Crops	14
7.	Vegetables	08

- 4.3 Balckgram - Introduction; area, production and productivity in India and Andhra Pradesh; Soils; land preparation; climatic requirements; seeds and sowing; fertilizer requirements and nutritional deficiencies if any; water and irrigation requirements, intercultivation; cropping systems; harvesting; threshing and yield.
- 4.4 Bengalgram - do -
- 4.5 Cowpea - do -
- 4.6 Horsegram - do -

5.0 OIL SEEDS

- 5.1 Groundnut :- Introduction; area, production and productivity in India and Andhra Pradesh; Soils; land preparation; climatic requirements; seeds and sowing; fertilizer requirements and nutritional deficiencies if any; water and irrigation requirements; intercultivation; cropping systems; harvesting; threshing and yield.
- 5.2 Sunflower - do -
- 5.3 Safflower - do -
- 5.4 Sesame - do -
- 5.5 Soya bean - do -
- 5.6 Castor - do -
- 5.7 Mustard & Rapeseed - do -

6.0 COMMERCIAL CROPS

- 6.1 Cotton -Introduction; area, production and productivity in India and Andhra Pradesh; soils; land preparation; climatic requirements; seeds and sowing; fertilizer requirements and nutritional deficiencies if any; water and irrigation requirements; intercultivation; cropping systems; harvesting; threshing and yield.
- 6.2 Sugarcane - Introduction; area, production and productivity in India and Andhra Pradesh; soils; land preparation; climatic requirements; seeds and sowing; fertilizer requirements and nutritional deficiencies if any; water and irrigation requirements; intercultivation; cropping systems; harvesting; threshing and yield.
- 6.3 Turmeric - do -
- 6.4 Chillies - do -

6.5 Tobacco - do -

7.0 VEGETABLES

7.1 Tomato - Introduction; area, production and productivity in India and Andhra Pradesh; Soils; land preparation; climatic requirements; seeds and sowing; fertilizer requirements and nutritional deficiencies if any; water and irrigation requirements; intercultivation; cropping systems; harvesting; threshing and yield.

7.2 Brinjal - do -

7.3 Lady's Finger - do -

7.4 Onion & Garlic - do -

8.0 FRUITS

8.1 Mango - Introduction; area, production and productivity in India and Andhra Pradesh; Soils; land preparation; climatic requirements; seeds and sowing; fertilizer requirements and nutritional deficiencies if any; water and irrigation requirements; intercultivation; cropping systems; harvesting; threshing and yield.

8.2 Citrus - do -

8.3 Banana - do -

8.4 Guava - do -

8.5 Pomegranate – Introduction; area, production and productivity in India and Andhra Pradesh; Soils; land preparation; climatic requirements; seeds and sowing; fertilizer requirements and nutritional deficiencies if any; water and irrigation requirements; intercultivation; cropping systems; harvesting; threshing and yield.

8.6 Grape - do -

MODULE – I

CROP HUSBANDRY

ON THE JOB TRAINING

No. of Hours per week = 18

No. of Hours per module = 216

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1. Raising a field crop and horticultural crop, performing all cultural operations individually (to be continued till the end of the year)
 2. Raising of dry nursery of rice
 3. Raising of wet nursery of rice
 4. Identification of crops and seeds
 5. Calculation of seed requirements for important crops of the region.
 6. Calculation of fertilizer requirements for important crops of the region.

7. Direct seeding practice of rice in the main field
 8. Transplanting practice of rice
 9. Recording of various growth observations in crop raised by the student
 10. Study and analysis of growth stages of various crops
 11. Participation in different farm operations other than individually raised plots
 12. Study of agronomic characters of rice varieties and hybrids
 13. Study of agronomic characters of maize varieties and hybrids
 14. Study of agronomic characters of millets varieties and hybrids
 15. Study of agronomic characters of pulses varieties and hybrids
 16. Study of agronomic characters of oilseeds varieties and hybrids
 17. Study of agronomic characters of commercial crops varieties and hybrids
 18. Study of agronomic characters of Vegetables varieties and hybrids
 19. Study of agronomic characters of fruits varieties and hybrids
 20. Seed treatment with fungicides
 21. Rhizobium inoculation of seeds.
 22. Inoculation of other bio-fertilizers.
 23. Identification of study of nutrient deficiency symptoms in cereals
 24. Identification of study of nutrient deficiency symptoms in millets
 25. Identification of study of nutrient deficiency symptoms in pulses
 26. Identification of study of nutrient deficiency symptoms in oilseeds
 27. Identification of study of nutrient deficiency symptoms in commercial crops
 28. Identification of study of nutrient deficiency symptoms in vegetables.
 29. Identification of study of nutrient deficiency symptoms in fruits.
 30. Visit to nearby farmers fields
 31. Study of different methods of harvesting in cereals.
 32. Study of different methods of harvesting in millets
 33. Study of different methods of harvesting in pulses.
 34. Study of different methods of harvesting in oilseeds.
 35. Study of different methods of harvesting in commercial crops.
 36. Study of different methods of harvesting in vegetables.
 37. Study of different methods of harvesting in fruits.
 38. Harvesting and threshing of crop raised by the student
 39. Participation of post-harvest operations of various crops.
 40. Estimation of yield in various crops.
 41. Visit to ICRISAT
 42. Visit to ICAR institutions
 43. Visit to ANGRAU Research Stations related to cereals, millets, pulses, oilseeds, commercial crops, vegetables and fruits.
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**MODULE – II :
SOIL SCIENCE**

THEORY:

72 HOURS

Sl.No.	Major Topics	No. of Hours
1.	Introduction	01
2.	Soil Water Relations	05
3.	Plant Water relations	03
4.	Essential Plant Nutrients	10
5.	Manures and fertilizers and their role in crop production	13
6.	Determination of nutrients in soil and their role in crop production	12
7.	Fertilizer recommendations	05
8.	Problem soils and their management	04
9.	Irrigation	04
10.	Soil and water conservation	10
11.	Water Management	05
Total		72

1.0 INTRODUCTION

2.0 SOIL WATER RELATIONS

Introduction; Soil properties influencing soil-water relations – soil depth, soil texture, soil structure, particle density, bulk density and pore space; physical classification of water – gravitational water, capillary water and hygroscopic water; field capacity; permanent wilting point; available soil moisture and hygroscopic coefficient; infiltration and deep percolation.

3.0 PLANT WATER RELATIONS

Introduction; evapotranspiration; factors influencing evapotranspiration; effective rainfall; water requirement and critical growth stages.

4.0 ESSENTIAL PLANT NUTRIENTS

Macronutrients; micro – nutrients; deficiency symptoms.

5.0 MANURES AND FERTILIZERS AND THEIR ROLE IN CROP PRODUCTION

Manures – Farm yard manure; compost; green manure, bone meal; fish meal, oil cakes; fertilizers – Nitrogen, phosphorus, potassium; micro –nutrients; Bio-fertilizers.

6.0 DETERMINATION OF NUTRIENTS IN SOIL AND THEIR ROLE IN CROP PRODUCTION

Nitrogen; phosphorus; potassium; magnesium; sulphur; iron; manganese; copper; zinc; molybdenum; boron; rating of soil test values and fertility indices.

07 FERTILIZER RECOMMENDATIONS

Soil test based fertilizers recommendations for major crops in Andhra Pradesh; interpretation of soil test data for knowing soil fertility.

08 PROBLEM SOILS AND THEIR MANAGEMENT

09 IRRIGATION

Introduction; Methods of irrigation – surface irrigation; sub surface irrigation; sprinkler irrigation; drip irrigation; and fertigation.

10 SOIL AND WATER CONSERVATION

Introduction, Soil erosion; types of soil erosion; soil and water conservation measures – agronomic, mechanical and forestry measures.

11 WATERSHED MANAGEMENT

Importance; definition, concept of watershed management, principles of watershed management, objectives of watershed management and alternate land use systems.

**MODULE – II:
SOIL SCIENCE
ON THE JOB TRAINING**

(216 HOURS)

1. Collection of surface soil sample from the field
2. Collection of composite soil sample from the field

3. Preparation of Soil sample and storage
4. Maintenance of equipment used in soil testing lab
- 5.0 Estimation of following in Soils:**
- 5.1 Mechanical analysis of soil by hydrometer method
- 5.2 Mechanical analysis of soil by Robinson's pipette method
- 5.3 PH
- 5.4 EC
- 5.5 Organic Carbon
- 5.6 Available Nitrogen
- 5.7 Available phosphorus
- 5.8 Available potassium
- 5.9 Available calcium
- 5.10 Available Magnesium
- 5.11 Available sulphur
- 5.12 Available Iron
- 5.13 Available Copper
- 5.14 Available Zinc
- 5.15 Available Manganese
- 5.16 Available Molybdenum
- 5.17 Available Boron
- 5.18 P fixing capacity of soil
- 5.19 K fixing capacity of soil
- 5.20 Interpretation of soil test data
- 6.0 Determination of Gypsum requirement of soil
- 7.0 Determination of lime requirement of Soil
- 8.0 Reclamation of problematic soils**
- 8.1 Saline soils
- 8.2 Saline alkali
- 8.3 Alkali
- 8.4 Calcareous alkali
- 8.5 Acid soils
9. Interpretation of soil test data
10. Visit to soil testing laboratories
11. Determination of bulk density
12. Determination of particle density
13. Determination of porosity
14. Measurement of Soil moisture by Gravimetric Method
15. Measurement of Soil moisture by volumetric method
16. Measurement of soil moisture by neutron moisture meters.

17. Measurement of soil moisture by tension meters
18. Determination of field capacity
19. Determination of permanent wilting point
20. Calculation of soil loss by universal soil loss equation
21. Visit to WALAMTARI
22. Visit to CRIDA
23. Visit to watershed areas

**MODULE – III:
PLANT PROTECTION**

THEORY:

		72 HOURS
Sl.No.	Major Topics	No. of Hours
1.	Introduction to plant protection	14
2.	Insect pest management in crops	19
3.	Disease Management in Crops	19
4.	Rodents and their management	02
5.	Weed management in crops	18
Total		72

1.0 INTRODUCTION TO PLANT PROTECTION

- 1.1 Principles of plant protection
- 1.2 Conditions conducive for the out-break of pests and diseases
- 1.3 Integrated pest management
- 1.4 Plant protection chemicals and bio-pesticides
- 1.5 Pesticide formulations
- 1.6 Plant protection equipment
- 1.7 Precautions in handling plant protection chemicals

2.0 INSECT PEST MANAGEMENT

- 2.1 Insect pests of cereals and their management
- 2.2 Insect pests of millets and their management
- 2.3 Insect pests of pulses and their management

- 2.4 Insect pests of oilseeds and their management
- 2.5 Insect pests of commercial crops and their management
- 2.6 Insect pests of vegetables and their management
- 2.7 Insect pests of fruits and their management

3.0 DISEASE MANAGEMENT

- 3.1 Diseases of cereals and their management
- 3.2 Diseases of millets and their management
- 3.3 Diseases of pulses and their management
- 3.4 Diseases of oilseeds and their management
- 3.5 Diseases of commercial crops and their management
- 3.6 Diseases of vegetables and their management
- 3.7 Diseases of fruits and their management

4.0 RODENTS AND THEIR MANAGEMENT

5.0 WEED MANAGEMENT IN CROPS

- 5.1 Weeds associated with cereals & millets and their management
- 5.2 Weeds associated with pulses and their management
- 5.3 Weeds associated with oilseeds and their management
- 5.4 Weeds associated with commercial crops and their management
- 5.5 Weeds associated with vegetables and their management
- 5.6 Weeds associated with fruits and their management

**MODULE – III:
PLANT PROTECTION
ON THE JOB TRAINING**

No. of Hours per week : 18

No. of Hours per week : 216

1. Operation, maintenance and study of hand operated sprayer
2. Operation, maintenance and study of knapsack sprayer
3. Operation, maintenance and study of compression sprayer
4. Operation, maintenance and study of foot rocking sprayer
5. Operation, maintenance and study of hand operated rotary duster
6. Operation, maintenance and study of power sprayer
7. Operation, maintenance and study of power duster
8. Precautions in handling plant protection chemicals
9. Identification of insects and damage symptoms of cereals
10. Identification of insects and damage symptoms of millets
11. Identification of insects and damage symptoms of pulses
12. Identification of insects and damage symptoms of oilseeds
13. Identification of insects and damage symptoms of commercial crops
14. Identification of insects and damage symptoms of vegetables
15. Identification of insects and damage symptoms of fruits
16. Identification of plant pathogen and damage symptoms of cereals
17. Identification of plant pathogen and damage symptoms of millets
18. Identification of plant pathogen and damage symptoms of pulses
19. Identification of plant pathogen and damage symptoms of oilseeds
20. Identification of plant pathogen and damage symptoms of commercial crops
21. Identification of plant pathogen and damage symptoms of vegetables
22. Identification of plant pathogen and damage symptoms of fruits
23. Identification of crop specific weeds associated with cereals
24. Identification of crop specific weeds associated with millets
25. Identification of crop specific weeds associated with pulses
26. Identification of crop specific weeds associated with oilseeds
27. Identification of crop specific weeds associated with fruits
28. Identification of crop specific weeds associated with commercial crops
29. Identification of crop specific weeds associated with vegetables
30. Acquaintance with different pesticides and formulations
31. Calculation of doses for different pesticides and formulations
32. Collection of information on the available trade formulations of important pesticides
33. Preparation of baits for rodents
34. Seed Treatment
35. IPM Case Studies
36. Study of important species of parasites and predators
37. Study of pheromone traps and light traps
38. Herbarium preparation for insect pest symptoms
39. Herbarium preparation for disease pest symptoms.

40. Herbarium preparation of weeds of different crops

41. Visit to NPPTI

7. LIST OF TOOLS AND EQUIPMENT

Sl. No.	Item	Number / Quantity Required
1.	Spade	15
2.	Pick axe	15
3.	Khurpi	30
4.	Slickle	15
5.	Crow bar	03
6.	Buckets	06
7.	Baskets	15
8.	Seed and fertilizer drill (Bullock drawn)	01
9.	Wooden plough	03
10.	Mould board plough	01
11.	Harrow	02
12.	Ridge Former / Leveller	01
13.	Cultivator	01
14.	Hand Hoe	03
15.	Wheel Barrow	01
16.	Plank	1
17.	Winnowing stool	1
18.	Hand rotary duster	1
19.	Foot sprayer	1
20.	Knap sack sprayer	1
21.	Power sprayer	1
22.	Seed treating drum	1
23.	Insect killing bottle	5
24.	Insect net	3
25.	Seed storage bins	3
26.	Soil augers	3
27.	Sampling tube	3
28.	Soil and water test kits	4

29	Soil colour chart	1
30	Rain gauge	1
31	Dry and wet bulb thermometer	1
32	Hygrometer	1
33	Physical balance	1
34	Weight box	1
35	Mortar and pestle	1
36	Laboratory grinder	3
37	Aluminium moisture box	1
38	Digestion and distillation unit	1
39	Distillation water5 still	1
40	Sieves Set	1
41	Hot Plate	1
42	Water Bath	1
43	Insect cabin box	6
44	Thermometer	6
45	Chemical Balance	1
46	Trays	6
47	Wash bottle	15
48	Sample divider	1
49	Gravity separator	1
50	Conductivity bridge	1
51	Conductive bridge	1
52	Hand refract meter	1
53	Tensiometers	1
54	Neutron Moisture metre	1
55	Digestion and distillation unit	1
56	Flame photometer	1
57	Calorimeter	1
58	Distilled water unit	1
59	Sprinkler irrigation unit	1
60	Drip irrigation unit	1
61	Tractor 35 HP	1
62	Power tiller	1
63	Tractor drawn cultivator, disc harrow, disc plough. M.B.Plough. Ridger etc.	1
64	Moisture meter	1
65	Precision balance (0.01g precision and 500 grams capacity)	1

66	Double ring infiltro meter	1
67	Secataur	10
68	Grafting and budding knife	10
69	Water can with rose	10
70	Germination trays	10
71	Measuring tape	01
72	Tree Pruner	2
73	Refrigerator	1
74	Electrical liven	1
75	Charts showing symptoms of nutrients disorders, pests and diseases	
76	Charts showing different methods of pruning and training	

LIST OF GLASS WARE

Sl.No.	Item	Number / Quantity Required
1.	Beakers – 50 ml to 10 ml	As per requirement
2.	Petri dishes (100 mm dia)	50
3.	Graduate measuring cylinders	As per requirement

LIST OF FIELD FACILITIES

1.	Wet Land	1 Ha
2.	Dry Land	1 Ha
3.	Irrigated Dry Land	1 Ha
4.	Bullock pair (May be hired on daily wage basis to given practical training to students)	1

8. QUALIFICATIONS FOR TEACHING FACULTY

- a). Minimum qualification : B.Sc (Ag.)
- b). Preferential qualification :
1. M.SC (AG) or
 2. B.Sc(AG.) with five years teaching experience

9. REFERENCES

1. Modern techniques of raising field crops – Chidda Singh
2. Crop management – S.S. Singh
3. Vegetable Crops of India – K.S.Yawalkar
4. Fruit physiology and production – Amar Singh
5. Principles and procedures of plant protection – S.B.Chattopadhyaya
6. Economic and applied entomology – Kanwar and Nigam
7. Plant diseases – R.S.Singh
8. Nature and properties of soils – Buckman and Brady
9. Han book of agriculture – ICAR, New Delhi
10. Principles of weed science – V.S.Rao
11. Irrigation theory and practice – A.H. Michael

10. LIST OF PARTICIPANTS

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