

## SMS (HORTICULTURE) (DETAILED SYLLABUS)

### **Introductory**

Knowledge about Rajasthan special focus to district Churu demography, topography, Climatic vulnerabilities, Resources, potentialities, limitations etc. Networking of Krishi Vigyan Kendra and ICAR systems, Gandhi Vidya Mandir and its subsidiaries.

### **Production technology of fruit plants**

Commercial varieties of regional, national and international importance, eco-physiological, recent trends in propagation, rootstock influence, planting systems, cropping systems, root zone and canopy management, nutrient management, water management, weed management, fertigation, role of bio-regulators, abiotic factors limiting fruit production, physiology of flowering, pollination fruit set and development, honeybees in cross pollination, physiology disorder causes and remedies, quality improvement by management practices; maturity indices, harvesting, grading, packing, storage and ripening techniques; industrial and export potential, Agri. Export Zones (AEZ) and industrial supports.

**Crops:** Bael, Fig, Jamun, Aonla, Pomegranate, Phalsa , Ber , Mango , Banana, Citrus ,Papaya, Guava, Sapota , Dragan fruit, and other minor fruits.

### **Propagation and nursery management for fruit crops**

Introduction, life cycle in plants, cellular basis for propagation, sexual propagation, apomixis, polyembryony, chimeras. Principles factors influencing seed germination of horticultural crops, dormancy, hormonal regulation of germination and seedling growth.

Seed quality, treatment, packing, storage, certification, testing. Asexual propagation rooting of soft and hard wood cutting under mist by growth regulators. Rooting of cutting in hotbeds.

Budding and grafting - selection of elite mother plants, methods. Establishment of bud wood bank, stock, scion and inter stock, relationship - Incompatibility. Rejuvenation through top working - Progeny orchard and scion bank.

Micro-propagation - Principles and concepts, commercial exploitation in horticultural crops. Techniques - *in vitro* clonal propagation, direct organogenesis, embryogenesis, micrografting, meristem culture. Hardening, packing and transport of micro-propagules. Nursery - Types, Structures, Components, Planning and Layout. Nursery management practices for healthy propagule production.

### **Production technology of vegetable crops**

Introduction, and taxonomy, climatic and soil requirements, commercial varieties/ hybrids, sowing/planting times and methods, seed rate and seed treatment, nutritional and irrigation requirements, intercultural operations, weed control, mulching, physiological disorders, harvesting, post-harvest management, plant protection measures and seed production of :

**Crops:** Green leafy cool/warm season vegetables, Cole crops : Cabbage, Cauliflower, knol khol and broccoli, Root crops : Carrot, Radish, Turnip and Beetroot, Bulb Crops: Onion and garlic. Peas and

broad bean, Tomato, eggplant(brinjal), hot and sweet peppers, Okra, beans (French bean, Indian bean and cluster bean) and cowpea, All Cucurbitaceous crops suitable for area, sweet potato

### **Seed production technology of vegetable crops**

Definition of seed , types and its quality, new seed policies; DUS test, scope of vegetable seed industry in India. Genetical and agronomical principles of seed production; methods of seed production; use of growth regulators and chemicals in vegetable seed production; floral biology, pollination, breeding behavior, seed development and maturation. Physiological maturity, seed harvesting, extraction, curing, drying, grading, packing, storage and marketing.

**Crops:** Solanaceous / cucurbits/ leguminous vegetables, cole crops, bulb crops, leafy vegetables, okra, etc.

### **Landscaping, gardening and production of plantation crops**

Landscape designs, types of gardens, English, Mughal etc. Styles of garden, formal, informal and free style gardens. Urban landscaping, Landscaping for specific situations, institutions, industries, residents, hospitals, roadsides, traffic islands, dam sites etc. Production technology for ornamental plants suitable for arid and semi-arid areas.

Lawns, Establishment and maintenance, special types of gardens, vertical garden, roof garden, bog garden, sunken garden etc.

Plantation crops: Plant density planting, nutritional requirements, physiological disorders, role of growth regulators and macro and micro nutrients, water requirements, fertigation, moisture conservation, shade regulation, training and pruning, maturity indices, harvesting. Cost benefit analysis, organic farming, precision farming.

### **Production technology of spice crops**

Introduction, importance of spice crops, climatic and soil requirements, commercial varieties/ hybrids, site selection, layout, sowing/ planting times and methods, seed rate and seed treatment, nutritional and irrigation requirements, intercropping, mixed cropping, intercultural operations weed control, mulching, physiological disorders, harvesting, post harvest management, plant protection measures and seed planting material and micro-propagation, precision farming, organic resource management, organic certification, quality control.

**Crops:** Coriander, Fenugreek, cumin, fennel, ajowain etc.

### **Production technology of medicinal and aromatic crops**

Classification of medicinal crops, Indigenous Traditional Knowledge, IPR issues, System of cultivation, Organic production, Production technology for Senna, Aswagandha, Sarpagandha, Aloe vera, Phyllanthus amarus, solanum, Isabgol, Safed musli etc.

Post harvest handling - Drying, Processing, Grading, Packing and Storage, value addition, GMP and

quality standards in herbal products. Influence of biotic and abiotic factors on the production of secondary metabolites.

### **Post harvest management and processing of crops**

Importance of post-harvest technology . Maturity indices, harvesting, handling, grading of fruits, vegetable, cut flowers, plantation crops, medicinal and aromatic plants. Pre-harvest factors affecting quality, factors responsible for deterioration of horticultural produce, physiological and biochemical changes, hardening and delaying ripening process. Methods of storage for local market and export. Principles and methods of preservation by heat pasteurization canning, bottling. Methods of preparation of juices, squashes, syrups, cordials and fermented beverages. Jam, jelly and marmalade. Preservation by sugar and chemicals, candies, crystallized fruits, preserves chemical preservatives, preservation with salt and vinegar, pickling, chutneys and sauces, tomato and mushrooms, freezing preservation.

### **Protected cultivation of fruits and vegetables**

Poly house/Greenhouse –Present and future scenario, suitability as per different agro-climatic zones of Rajasthan, Environmental factors and their effects on plant growth and their management

Basics of poly house /greenhouse design, different types of structures – glasshouse, shade net, poly tunnels - Design and development of low cost greenhouse structures.

Interaction of light, temperature, humidity, CO<sub>2</sub>, water on crop regulation - Greenhouse heating, cooling, ventilation and shading. Micro irrigation and Fertigation, Management of pest and diseases.