

Post: Associate Professor
Course of Syllabus-AGRONOMY

1. Development of Agronomy as a Science

- 1.1 History of agronomy before and after 20th century
- 1.2 Functions of CGIAR, International Agricultural Research centers, and NARC
- 1.3 Establishment of land grant universities and their impact
- 1.4 Green revolution and its impact on food production
- 1.5 Gene revolution transgenic crops and its impart
- 1.6 Precision agronomy, Geo-informatics in precision agriculture, use of IT
- 1.7 Machine learning and artificial intelligence in agronomic management
- 1.8 Nanotechnology concept, its use in seed, fertilizer, pesticides and management

2. Crop growth and growth analysis.

- 2.1 Crop growth, growth response curve, factor affecting crop growth
- 2.2 Liebig low, Mitscherlich law, Wilcox agrobiolgy and Blackman few of optima
- 2.3 Determination and significance of AGR, RGR, COR, NAR, LAR, SIA, LAI and LAD
- 2.4 Crop growth and simulation modeling

3. Physiological principles of crop production

- 3.1 Leaf and canopy photosynthesis and factors affecting them
- 3.2 Differences among C3, C4 and CAM plants
- 3.3 Growth and maintenance respiration, photorespiration and conversion efficiency
- 3.4 Transpiration and evapotranspiration
- 3.5 Source sink relationship
- 3.6. Physiological bases of yield variation in crops.
- 3.7 Yield gap analysis and closing the yield gaps

4. Climate and crop production

- 4.1 Effect of solar radiation, temperature, humidity, and wind on crop production
- 4.2 Effect of rainfall, occurrence of monsoon and its impact on crops in Nepal
- 4.3 Climate change, potential impact of climate change on Nepalese agriculture
- 4.4 Weather forecasting and its implication in crop production
- 4.5 Climate smart agriculture in context with Nepal

5. Soil Plant Water Relationship

- 5.1 Concept of water potential and its relation with water translocation in SPAC
- 5.2 Water retention and movement in soil.
- 5.3 Effect of drought on crop growth, photosynthesis, and yield of crops
- 5.4 Crop adaptation to drought and drought management for field crops
- 5.5 Excess water stress on physiology and growth of crops
- 5.6 Crop management under excess water stress
- 5.7 Water use efficiency and strategies to increase WUE in crops
- 5.8 Irrigation and irrigation scheduling, drainage, and types of drainage
- 5.9 Water saving technologies in crop production
- 5.10 Concept and techniques of watershed management

6. Soil fertility management for field crops

- 6.1 Essential elements, functions and deficiency symptoms
- 6.2 Soil fertility issues and declining soil fertility in Nepal
- 6.3 Manures and fertilizers classification, characteristics and methods of applications
- 6.4 Bio fertilizer and green maturing in crop production
- 6.5 Fertilizer recommendation approaches and fertilizer use efficiency

6.6 SSNM, Nutrient expert software of IPNI and IPNM in crop production

6.7 Concept of soil quality and soil health, soil resistance and resilience

6.8 Soil fertility evaluation and management of problematic soil

7. Conservation agriculture and sustainable agriculture

7.1 Concept, history, principles and benefits of conservation agriculture (CA)

7.2 Tillage, conventional and conservation tillage, various tillage system used in CA

7.3 Sustainable intensification of agriculture and soil quality in CA

7.4 Direct seeded rice, Zero tillage wheat, maize, grain legumes and oilseed crops

7.5 Concept, steps, and benefits Sloping Agriculture Land Technology (SALT)

8. Weed Science and Weed management

8.1 Definition, characteristics, classification, losses and importance of weeds

8.2 Ecology, reproduction and mode of dispersal of weeds

8.3 Prevention, eradication and control of weeds

8.4 Physical, cultural, biological and chemical weed control methods

8.5 Ecological weed management and integrated weed management

8.6 Parasitic, noxious, aquatic and invasive weeds of Nepal

8.7 Classification, formulations, trade names and selectivity of herbicides

8.8 Mode of action of herbicides and herbicides recommendations

8.9 Herbicide resistance and its management

8.10 Herbicides and their interactions with environment

8.11 Weed management in cereals, grain legumes, oilseeds and commercial crops

9. Seed Science and Technology

- 9.1 Seed, types, parts of seed and their functions, seed quality and its importance
- 9.2 Seed formation and endosperm developments
- 9.3 Seed dormancy and types, seed germination and types.
- 9.4 Physiological aspects and factors affecting seed dormancy and germination
- 9.5 Seed viability, vigor, longevity and seed deterioration and factors affecting
- 9.6 Basic principles of inbred, hybrid, and organic seed production of field crops
- 9.7 Seed processing and seed quality testing, seed certification and truthful labeling
- 9.8. Recalcitrant seed, production, storage and deterioration
- 9.9 Seed multiplication, marketing and distribution
- 9.10 National and international law and organization involved in seed.
- 9.11 Seed vision 2013-2025, CBD, ITPGRFA-2001 and ISTA

10. Cropping system and crop density

- 10.1 Multiple cropping system, types, requirements and advantages
- 10.2 LER, crop equivalent yield, system yield, cropping intensity
- 10.3 Crop rotation. Principles and advantages
- 10.4 Sustainability of Rice-wheat, Rice-Maize, Rice- Rice system in Terai.
- 10.5 Sustainability of Maize- Maize, Maize/ cowpea, Maize/millet system in mid hills
- 10.6 Agronomic management of cropping system in Nepal
- 10.7 Crop density and crop yield, management of optimum plant density
- 10.8 Crop geometry, Plant distribution and planting methods

11. Crop Production:

Introduction and importance, origin, area, production, productivity, distribution, soil and climatic requirement, constraints and opportunities of production, recent research advancement, improved cultural practices: land preparation, nursery raising, seeds and sowing, nutrients, water and weed management, harvesting, threshing, cleaning drying and storage, and recommended/registered and varieties for special situation of

11.1 Cereal crops: Rice, wheat, maize, barley, finger millet, and buckwheat

11.2 Grain legumes: Lentil, pigeon pea, black gram, green gram, chickpea, cowpea, field bean, and grass pea

11.3 Oilseed crops: Rape and mustard, sunflower, sesame, soybean, groundnut and linseed and Niger

11.4 Commercial crops: Sugarcane, cotton, jute, tobacco and potato

12. Agricultural statistics and experimental design

12.1 Principles of field experimentation

12.2 Experimental design: two and three factors experiments in CRD, RCBD, Split plot design, split-split plot design, strip plot design, strip-split plot design. Randomization, Layout and ANOVA

12.3 Pair comparison: LSD, DMRT

12.4 Missing data, data that violate some assumption of ANOVA, data transformation

12.5 Regression and correlation analysis

13. Principles of Organic Agriculture, agro-ecology and sustainable agriculture

13.1 Concept, principles, scope in Nepal and objectives of organic agriculture

13.2 Concept of Permaculture, Biodynamic agriculture and Natural farming

13.3 Soil fertility management under organic agriculture

13.4 Organic insect, diseases and weed management

13.5 National standards and guidelines for OA in Nepal

13.6 Organic product certifications, accreditation and marketing

13.7 Food quality aspects of organic agriculture

13.8 Concept and elements of sustainable agriculture, indicators of sustainability

13.9 Principles and elements of agro-ecology: Diversity, Synergies.

13.10 efficiency, resilience, recycling, co-creation and sharing of knowledge

14. International and National Projects in the field crops.

14.1 CSISA (Cereal System initiative for South Asia)

14.2 Seed and Fertilizer Project of CIMMYT

14.3 Feed the Future Project

14.4 PMAMP, LIBIRD, FORWARD

15. Advances in research in the area of agronomy.

*नोट: विश्वविद्यालयसँग सम्बन्धित २ वटा प्रश्नहरू (२*५) तयार गरिदिनुहुन अनुरोध गर्दछौं ।*