

Agronomy

1. Overview of Agronomy

- 1.1 Definition and scope of Agronomy and role of Agronomist.
- 1.1 History of development of Agronomy as a science
- 1.2 Establishment of Land Grant College/University
- 1.3 Green revolution and its role in food production
- 1.4. Establishment of International Agriculture Research centers (IARCs), and Nepal Agricultural Research Council (NARC) and their role in crop production.
- 1.5. Genetic engineering, transgenic crops and its role in crop production
- 1.6. Subsistence, commercial, sustainable, and precision agriculture.
- 1.7. Classification of crops

2. Weather and climate in relation to Agronomy

- 2.1 Effect of Solar radiation, temperature, precipitation, and wind on crop growth and crop production.
- 2.2 Effect of monsoon on crop production in Nepal
- 2.3 Climate change, impacts and its mitigation in Nepalese agriculture

3. Physiological principles of crop production

- 3.1 Leaf and canopy photosynthesis, factors affecting photosynthesis
- 3.2 Leaf orientation and light penetration, LAI development and dry matter production
- 3.3 Respiration: Growth and maintenance respiration, conversion efficiency of crops.
- 3.4 Photorespiration and dry matter production, differences between C3, C4 crops
- 3.5 Transpiration, Evapotranspiration and its relation with crop growth.

4. Crop growth and growth analysis

- 4.1 Crop growth, growth response curve with time, phases of growth
- 4.2 Factors affecting growth, growth limiting theories
- 4.3 Growth analysis: Absolute Growth Rate (AGR), Relative Growth rate (RGR), Crop Growth Rate (CGR), Net Assimilation Rate (NAR), Leaf Area Index (LAI), Leaf Area Duration (LAD), Harvest Index (HI), Specific Leaf Area (SLA)
- 4.4 Yield: Economic and biological yield, Potential yield, Attainable yield, National yield, Yield gap analysis, closing yield gaps

5. Seed and seed quality

- 5.1 Seed and seed quality, hybrid, composite and organic seed.
- 5.2 Seed dormancy, viability, germination and vigor; factors affecting quality seed.
- 5.3 Classification of seed and their multiplication techniques, seed deterioration, longevity, certification and distribution; and seed laws.
- 5.4 Seed production of some important agronomical crops.

6. Weed management

- 6.1 Definition, characteristics, classification, losses caused and economic importance of weeds; ecology of weeds, reproduction and mode of weed seed dispersal; competition between crops and weeds;
- 6.2 Concept of prevention, eradication and control; weed control methods: Physical, cultural, biological, chemical, integrated weed management;
- 6.3 Introduction to herbicides, mode of action and fate of herbicides; weed management practices in major field crops and noxious, parasitic and aquatic weeds management.

7. Soil fertility management in agronomical crops

- 7.1 Soil fertility problems and issues in Nepal
- 7.2 Classification, criteria, function, deficiency and toxicity of essential elements
- 7.3 Manures and fertilizers: Composition, characteristics, applications of various organic manures and fertilizers in crop production with their merits and demerits.
- 7.4 Fertilizer recommendation methods with their merits and demerits.

8. Tillage management in crop production

- 8.1 Definition, history and objectives of tillage, characteristics good quality of tillage.
- 8.2 Primary, secondary and inter tillage, tillage implements used in Nepal.
- 8.3 Conventional and conservation tillage with their advantages and disadvantages.

9. Cropping system, crop rotation and crop density

- 9.1 Monoculture and multiple cropping system, requirements, types and advantages of multiple cropping system.
- 9.2 Crop rotation, principles and practices of crop rotation with advantages and disadvantages.
- 9.3 Plant density, optimum plant population, factors affecting optimum plant population.
- 9.4 Inter and intra plant completion their effect on yield, plant population management.

10. Irrigation management in crop production

- 10.1 Definition, objectives of irrigation, methods of irrigation with their comparative advantage and disadvantage.
- 10.2 Scheduling of irrigation: Soil moisture depletion, IW/CPE, Critical crop growth stage approaches.
- 10.3 Drainage: adverse effect of water logging, requirement and types of drainage including use of laser land leveler.

11. Experimental design and statistics

- 11.1 Fundamental principles of field experimentation,
- 11.2 Experimental design: CRD, RCBD, factorial experiment, Split plot and strip plot
- 11.3 Mean comparison, correlation and regression analysis.

12. Crop production: Introduction and importance, origin, area, production, productivity, distribution, soil and climatic requirement, constraints and opportunities of production, improved cultural practices: land preparation, nursery raising, seeds and sowing, nutrients, water and weed management, harvesting, threshing, cleaning, drying and storage, and recommended varieties of:

- 12.1 Cereal crops: Rice, wheat, maize, finger millet and buck wheat
- 12.2 Grain legumes: Lentil, pigeon pea, black gram, green gram, chickpea, cowpea, field bean, and grass pea.
- 12.3 Oilseed crops: Rape and mustard, sunflower, sesame, soybean, groundnut, and linseed.
- 12.4 Commercial crops: Sugarcane, cotton, jute, tobacco and potato

13. Crop production under special condition

- 13.1 Impacts of drought on crop growth and yield
- 13.2 Crop management practices for water limited condition
- 13.3 Impacts submergence stress on crop growth
- 13.4 Crop management practices under submergence stress
- 13.5 Principles and practices of conservation agriculture
- 13.6 Principles and practices of organic agriculture
- 13.7 Sloping agricultural land technology for hilly region of Nepal.