

WEST AFRICAN SENIOR SCHOOL CERTIFICATE EXAMINATION
AGRICULTURAL SCIENCE

(For candidates in The Gambia, Nigeria and Sierra-Leone only)

PREAMBLE

This syllabus has been designed to portray Agricultural Science as an applied science with emphasis on the acquisition of knowledge and skills associated with the content. A general review of the Junior Secondary School Agricultural Science Syllabus is presumed.

Candidates will be expected to answer questions on all the topics set out in the column headed *syllabus*. The *notes* therein are intended to indicate the scope of the questions which will be set, but they are not to be considered as an exhaustive list of limitations and illustrations.

Schools must keep school farms where crops are grown with at least one species of livestock from each of the following two groups:

- (i) pigs, rabbit and poultry,
- (ii) goat, sheep and cattle and where feasible, fish pond.

The practical notebooks of candidates should contain records of individual activities based on laboratory and individual observations carried out in the school farms, field trips and also records of specimens collected. In order to enhance effective teaching/learning process and better performance by candidates, continuous assessment of candidates is recommended.

Since the main objectives of the Senior Secondary School Agricultural Science syllabus are to

- (i) stimulate and sustain students' interest in agriculture,
- (ii) enable students acquire basic knowledge and practical skills to prepare them for further studies and occupation in agriculture,

it is recommended that the study of Agriculture Science in the Senior Secondary School be supplemented by visits to well established government and private experimental and commercial farms, agricultural research institutes and other institutions related to agriculture.

EXAMINATION SCHEME

There will be two papers both of which must be taken.

PAPER 1 This will be a 1½ hour practical paper with a total score of 60 marks. This paper will consist of four questions all of which must be answered. This will be for school candidates only.

PAPER 2 This will be a 3-hour theory paper consisting of two parts:

Part I This will consist of sixty (60) multiple choice objective questions with a total score of 60 marks and of 1 hour duration.

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Part II Will consist of ten essay-type questions contained in five sections, A,B,C, D, and E. There will be two questions in each section.

Section A will contain questions drawn from Basic Concepts and Farm Mechanization while questions contained in Sections B, C, D and E will be drawn from Agricultural Ecology, Crop Production, Animal Production and Agricultural Economics and Extension respectively.

Candidates will be required to answer one question from each section. Each question carries a score of 16 marks. Thus the total score for Part II will be 80 marks. The duration is 2 hours.

PAPER 3: This will be a Test of Practical as an alternative to practical for private candidates only. The paper will consist of four questions for 1½ hours duration and carries 60 marks.

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DETAILED SYLLABUS

CONTENTS	NOTES
<p>A. BASIC CONCEPTS</p> <p>1. Agricultural Development in West Africa.</p> <p>Prospects and problems</p> <p>(a) Importance of agriculture and agricultural development in the national economy.</p> <p>(b) Differences between subsistence and commercial agriculture.</p> <p>(c) Problems created by</p> <p style="padding-left: 40px;">(i) inadequate land;</p> <p style="padding-left: 40px;">(ii) basic amenities-water, electricity, health care delivery;</p> <p style="padding-left: 40px;">(iii) finance;</p> <p style="padding-left: 40px;">(iv) transportation;</p> <p style="padding-left: 40px;">(v) storage and processing facilities;</p> <p style="padding-left: 40px;">(vi) agricultural education and extension;</p> <p style="padding-left: 40px;">(vii) farm inputs;</p> <p style="padding-left: 40px;">(viii) imperfect marketing system;</p> <p style="padding-left: 40px;">(ix) environmental degradation;</p> <p style="padding-left: 40px;">(x) abundance of diseases and pests;</p> <p>(d) Possible solutions to these problems.</p> <p>2. Agricultural laws and reforms</p> <p style="padding-left: 40px;">(a) Land tenure systems in West Africa.</p> <p style="padding-left: 40px;">(b) Government laws on land use in West Africa.</p> <p>3. (a) Roles of Government in agricultural production: providing loans, credits and subsidies.</p> <p style="padding-left: 40px;">(b) Role of non-governmental</p>	<p>A review of the importance of agriculture is necessary.</p> <p>Discussion to include the effect of land tenure system, inadequate communication systems, marketing system, farm inputs such as tools, machinery, labour and governmental attitudes.</p> <p>Discussion should include roles of the government, Non-governmental organizations (NGOs),</p>

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<p style="text-align: center;">organisations.</p> <p>B. AGRICULTURAL ECOLOGY</p> <p>1. Land and its Uses</p> <p>(a) Uses of land for agricultural and non-agricultural purposes: Uses of land for agriculture, forestry and wildlife conservation.</p> <p>(b) Factors affecting land availability and use:</p> <p>(i) Physical factors e.g., soil type, topography etc.,</p> <p>(ii) Socio-economic factors e.g., population pressure.</p> <p>2. Environmental factors affecting agricultural production:</p> <p>(a) Climatic factors: rainfall, temperature, light and wind.</p> <p>(b) Biotic factors: predators, parasites, soil micro-organisms, pests and diseases.</p> <p>(c) Edaphic factors: soil pH, soil texture and soil structure.</p> <p>3. Rock formation</p> <p>(a) rock types: igneous, sedimentary and metamorphic;</p> <p>(b) rock formation processes.</p> <p>4. Formation, composition and properties of soil</p> <p>(a) Factors of soil formation: parent rock, topography, organisms, climate, vegetation and time</p> <p>(b) Processes of soil formation: physical, chemical and biological processes.</p>	<p>private farmers etc.</p> <p>An over-view of the different land tenure systems in West Africa. Discussion should include Land Use Act (Decree), Land Reforms etc. in West Africa.</p> <p>Study should include government agricultural programmes like Farm Settlement schemes, Co-operative farming, Farm Insurance Scheme, OFN, River Basin Authorities, Green Revolution, Agricultural Development Projects (ADP), TESITO (Do it yourself), Agric. Sect. Rehabilitation Project, (A.S.R.P.). National Aids Co-ordination secretariat.</p> <p><i>Examples of NGOs</i> West African Rice Development Agency (WARDA), International Institute of Tropical Agriculture (IITA), International Livestock Centre for Africa (ILCA), (IFAD), International Crop Research Institute for Semi-Arid Tropics (ICRISAT).</p>
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<p style="text-align: center;">(c) Composition, types and properties of soil: sand, clay, loam, organic matter, soil water, soil air, soil living organisms, soil texture, soil structure, soil pH and their importance.</p> <p>5. Plant nutrients and nutrient cycles</p> <p style="padding-left: 40px;">(a) Macro and micro-nutrients, their functions and deficiency symptoms, factors influencing nutrients availability in the soil.</p> <p style="padding-left: 40px;">(b) Methods of replenishing lost nutrients: soil rotation, organic manuring, inorganic fertilization, fallowing, liming, cover cropping.</p> <p style="padding-left: 40px;">(c) Nitrogen, Carbon and Water cycles.</p> <p>6. Effects of the following farming practices on the soil: bush burning, grazing/overgrazing, clean clearing, fertilizer application, organic manuring, crop rotation, continuous cropping, flooding.</p> <p>7. Irrigation and Drainage</p> <p style="padding-left: 40px;">(a) Irrigation: definition and its importance in Agriculture. Irrigation systems: overhead e.g., sprinkler, water can, etc. surface-flooding channel/furrow, underground e.g., perforated pipes, drips, etc., their advantages and disadvantages. Problems associated with irrigation e.g., maintenance, water availability, pests and diseases.</p> <p style="padding-left: 40px;">(b) Drainage: definition and its importance: drainage systems: surface, e.g., channel: furrow and underground pipes, advantages and disadvantages.</p> <p>C. FARM MECHANIZATION</p> <p>1. Sources of farm power including advantages and disadvantages of type: human, animal, mechanical, solar, wind, water, biogas, electricity.</p> <p>2. Farm machinery and implements: Tractor, bull-dozer, shellers, dryers, incubators, milking machines and tractor-coupled implements like ploughs, harrows, ridgers, planters, harvesters, sprayers.</p>	<p>Discussion on agricultural use of land should include uses of land for crop and animal production. Non-agricultural uses of land to include building of industries, roads and new towns, recreational centres, etc.</p> <p>Effects of the extension and expansion of industries, road rehabilitation and reconstruction should be mentioned.</p> <p>Discussion should include the effects of these factors on distribution and production of crops and animals in West Africa.</p> <p>Discussion on biotic factors should include competition, parasitism and symbiosis.</p>
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<p>3. Prospects and problems of mechanisation: Meaning, advantages, disadvantages and limitations of mechanization.</p> <p>4. Surveying and planning of farmstead</p> <p style="padding-left: 40px;">(a) Meaning and importance of farm surveying: Common survey equipment: ranging poles, Gunter's chain, measuring tape, prismatic compass, theodolite, offset staff, plumb bob, pins, arrows.</p> <p style="padding-left: 40px;">(b) Meaning and importance of farm planning, principles of farmstead outlay.</p> <p>D. CROP PRODUCTION</p> <p>1. Husbandry of selected crops: Methods of propagation, climatic and soil requirements, land preparation: planting date, seed rate, spacing, sowing date, nursery requirement, manuring and fertilizer requirement and application, harvesting, processing and storage of at least one representative crop from each of the following crop groupings:</p> <p style="padding-left: 40px;">(a) – Cereals : maize, rice, guinea corn, etc</p> <p style="padding-left: 40px;">(b) – Pulses (grain legumes) cowpea, soya bean, etc</p> <p style="padding-left: 40px;">(c) – Roots and tubers: cassava, yam, potatoes, etc</p> <p style="padding-left: 40px;">(d) – Vegetable : tomatoes, onion, amaranthus, okro, cauliflower and spinach, etc</p> <p style="padding-left: 40px;">(e) – Fruits : citrus, banana, pineapple, etc</p> <p style="padding-left: 40px;">(f) - Beverages : cocoa, tea and coffee, etc</p> <p style="padding-left: 40px;">(g) – Spices : pepper, ginger, etc</p> <p style="padding-left: 40px;">(h) – Oils : groundnut sheabutter, sunflower, etc</p> <p style="padding-left: 40px;">(i) – Fibres : cotton, jute, sisal hemp, etc</p> <p style="padding-left: 40px;">(j) Others : rubber, sugarcane, etc.</p> <p>2. Pasture and forage crops</p> <p style="padding-left: 40px;">(a) Types of pastures: (Natural and established) morphology of common grass and legume species in West Africa pastures.</p>	<p>Candidates should be able to describe, identify rock types and give examples.</p> <p>Formation of various types of rocks should be explained.</p> <p>The role played by each factor should be emphasized.</p> <p>Soil formation as a result of weathering of parent material through physical, chemical and biological weathering; transportation of the fragmented materials and the deposition and conversion of transported sediments into soil. Study of soil profile and identification of the stages of soil formation.</p> <p>Students are expected to study different types of soil and their separation into sand, silt and clay fractions. Study should also include water-holding capacity and drainage while causes, determination and correction of soil pH</p>
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<p>(b) Factors affecting distribution; establishment and productivity of pastures.</p> <p>3. Forest management: forest regulation, selective exploitation, deforestation, regeneration, afforestation and taungya system.</p> <p>4. Floriculture: importance of ornamental trees, shrubs and flowers.</p> <p>5. DISEASES AND PESTS OF CROPS</p> <p>(a) Diseases: causal organism, economic importance, transmission, symptoms, preventive and control measures of the diseases of the following crops:</p> <p>(i) Cereals – smut, rice blast, leaf rust, etc;</p> <p>(ii) Legume – Cercospora leaf spot, rosette etc;</p> <p>(iii) Beverages - cocoa blackpod, swollen shoot, coffee leaf rust etc.;</p> <p>(iv) Tuber - cassava mosaic, bacterial leaf blight etc.;</p> <p>(v) Fibre - black arm/bacterial blight of cotton, etc.,</p> <p>(vi) Vegetables - root knot of tomato or okro, damping off, onion twister, etc.;</p> <p>(vii) Stored produce – mould, etc.</p> <p>(b) Pests: important insect pests of major crops; field and storage pests, lifecycle, economic importance, nature of damage, preventive and control measures of the following major insect pests of crops:</p> <p>(i) Cereals - stem borer, army worm, ear worm, etc.,</p> <p>(ii) Legume - podborer, aphid, sucking bug and leaf beetle, etc</p> <p>(iii) Beverages – Cocoa myrid (capsids);</p> <p>(iv) Tuber - yam beetle, cassava mealybug, green spidermite, variegated grasshopper, etc</p> <p>(v) Fibre - cotton stainer, boll-worm;</p> <p>(vi) Fruits and vegetable - thrip,</p>	<p>should also be studied.</p> <p>Macro-elements are N, P, K, Ca, Mg, S. Micro-elements include Zn, Fe, Mo, Co, Ba, Cu. Factors influencing nutrient availability include pH, excess of other nutrients, leaching, crop removal, oxidation, burning.</p> <p>Types of fertilizers and methods of fertilizer application should be treated.</p> <p>Both the merits and demerits of the listed practices should be adequately treated.</p>
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<p style="text-align: right;">grasshopper, leaf roller, leaf beetle, scale insect;</p> <p>(vii) Stored produce - grain weevil, bean beetle.</p> <p>(c) Side effects of the various preventive and control methods: pollution, poisoning, disruption of ecosystem.</p> <p>6. Common weeds found in farms</p> <p>7. Crop improvement</p> <p style="padding-left: 20px;">(a) Meaning and aims</p> <p style="padding-left: 20px;">(b) Mendelian laws</p> <p style="padding-left: 20px;">(c) Processes of crop improvement, their advantages and disadvantages.</p> <p>E. ANIMAL PRODUCTION</p> <p>1. Anatomy and physiology</p> <p style="padding-left: 20px;">Identification of parts and important organs of farm animals and their functions – digestive (monogastric and ruminants), circulatory, reproductive, respiratory and nervous systems of farm animals.</p> <p>2. Animal reproduction</p> <p style="padding-left: 20px;">(a) Explanation of the following: oestrus cycle, heat period, mating, gestation period, parturition, lactation and colostrum.</p> <p style="padding-left: 20px;">(b) Processes of egg formation in poultry.</p> <p style="padding-left: 20px;">(c) Main reproductive hormones and their functions.</p> <p>3. Environmental physiology</p> <p>4. Livestock Management: housing, feeding, hygiene and finishing of at least one ruminant and one non-ruminant animal from birth to market weight.</p> <p>5. Animal nutrition</p> <p style="padding-left: 20px;">(a) Sources and functions of food nutrients:</p>	<p>Each source should be briefly explained. Safety precautions on the use of each farm power should be emphasized.</p> <p>A review of simple farm tools is necessary. Study should include functions, care and maintenance of the machinery and implements as well as identifying the major parts of tractor and implements coupled to it and their functions. Engineering details are however not required.</p> <p>Possible ways of improving agriculture through mechanization</p>
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<p>carbohydrates, proteins, fats, minerals, vitamins and water.</p> <p>(b) Types of ration/diet and their uses: components of a balanced diet; production and maintenance rations.</p> <p>(c) Causes and symptoms of malnutrition and their correction in farm animals.</p> <p>6. Range and Pasture management and improvement</p> <p>(a) Meaning and importance of rangeland and pasture to livestock and their characteristics.</p> <p>(b) Methods of rangeland and pasture improvement: controlled stocking, rotational grazing, use of fertilizers, introduction of legumes and reseedling.</p> <p>7. Principles of Animal Health Management</p> <p>(a) Predisposing factors; causal organisms, symptoms, transmission, effects, preventive and curative control of the following selected livestock diseases:</p> <p>(i) Viral: foot and mouth disease, rinderpest, Newcastle disease,</p> <p>(ii) Bacterial: anthrax, brucellosis, tuberculosis,</p> <p>(iii) Fungal: aspergilosis, ring worm,</p> <p>(iv) Protozoa: trypanosomiasis, coccidiosis, redwater.</p> <p>(b) Life cycle, economic importance and control of the following selected livestock parasites:</p> <p>(i) Endoparasites: tapeworm, liverfluke and roundworm,</p> <p>(ii) Ectoparasites: ticks, lice etc.</p> <p>8. Fish farming and fishery regulations</p> <p>(a) Definition and importance of fish farming.</p> <p>(b) Conditions necessary for sitting a fish pond.</p> <p>(c) Establishment and maintenance of a fish pond or aquarium.</p>	<p>should also be studied.</p> <p>Uses, care and maintenance of these equipment should be discussed.</p> <p>Engineering details are not required.</p> <p>Discussion on farmstead outlay should include factors determining location of different farm buildings, orchards, vegetable garden/plot e.g., topography, location of water sources, type of soil, soil relief, direction of wind and sunshine etc. Methods of carrying out simple farm layout survey including e.g., the use of 3, 4, 5 method should be studied.</p> <p>A general knowledge of husbandry of all the crops listed is presumed.</p>
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<p style="text-align: center;">(d) Fishery regulations.</p> <p>9. Animal improvement</p> <p style="padding-left: 40px;">(a) Meaning and aims,</p> <p style="padding-left: 40px;">(b) Methods of animal improvement: introduction, selection, breeding and their effects.</p> <p style="padding-left: 40px;">(c) Artificial insemination.</p> <p>F. AGRICULTURAL ECONOMICS AND EXTENSION</p> <p>1. Factors of production: land, labour, capital and management; functions of a farm manager.</p> <p>2. Basic economic principles</p> <p style="padding-left: 40px;">(a) Principles of demand and supply,</p> <p style="padding-left: 40px;">(b) Effects of demand and supply on agricultural returns,</p> <p style="padding-left: 40px;">(c) Law of diminishing returns.</p> <p>3. Agricultural Financing: Sources of farm financing: Agricultural banks, Commercial banks, Co-operative Societies, Money lenders, Credit and Thrift Societies, self-financing, Government agencies, N.G.Os, etc.</p> <p>4. Farm Records and Accounts. Importance and types of farm records and accounts, entries of sales and purchases, profit and loss accounts, inventories etc.</p> <p>5. Marketing of Agricultural Produce</p> <p style="padding-left: 40px;">(a) Meaning and importance of marketing.</p> <p style="padding-left: 40px;">(b) Marketing agents: Marketing/Commodity Boards, Co-operative Societies, Middlemen/</p>	<p>Detailed botanical studies are not required. Study should also include harvesting, preservation and storage. Both the common and botanical names should be known. Study should include pasture and forage crop management.</p>
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<p style="text-align: center;">Wholesalers and Producers.</p> <p>6. Agricultural Extension</p> <p style="padding-left: 40px;">(a) Meaning and importance of agricultural extension.</p> <p style="padding-left: 40px;">(b) Methods of disseminating new ideas and techniques to farmers.</p> <p style="padding-left: 40px;">(c) Agricultural Extension Programmes in West Africa.</p> <p style="text-align: center;">PRACTICAL AGRICULTURAL SCIENCE</p> <p>A. AGRICULTURAL ECOLOGY</p> <p>1. Soil</p> <p>2. Soil profile</p> <p>3. Rocks</p>	<p>A review of the importance and uses of forests is necessary.</p> <p>Discussion should include uses of ornamentals for beautification of environment and landscaping, interior decoration, and their cultivation. Sources of planting material.</p> <p>Studies to include at least two fungal, two viral, two bacterial and one nematode diseases of the crops chosen from the list.</p>
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<p>4. Laboratory work on physical properties of soil</p> <ul style="list-style-type: none"> (a) mechanical analysis by sedimentation and also by the use of hydrometer method or sieves, (b) determination of bulk density and total pore space, (c) determination of moisture content of a moist soil sample, (d) determination of maximum water holding capacity, (e) determination of wilting point to be demonstrated, (f) determination of capillary action. <p>5. Laboratory work on chemical properties of soil.</p> <ul style="list-style-type: none"> (a) demonstration of soil acidity using pH meter and/or any other gadget or simple equipment, (b) demonstration of the phenomenon of cation exchange capacity, (c) identification of common types of chemical fertilizers. (d) Organic manure. <p>6. Irrigation and drainage</p> <p>B. FARM MECHANIZATION</p> <p>1. Farm tools and equipment</p> <p>2. Tractor and animal drawn implements</p> <p>3. Harvesting, processing and storage equipment.</p>	<p>Studies to include at least one example of biting and chewing, piercing and sucking and boring insect pests. A brief mentioning of major groups of insecticides/pesticides- powder, liquid, granules and tablet is required. Other important pests of crops, e.g., birds, rodents, man, nematodes, their importance and control should also be studied.</p> <p>Cultural, biological and chemical methods of control are required.</p>
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<p>4. Farm tractor</p> <p>5. Uses and maintenance of horticultural tools and implements,</p> <p>6. Livestock and fishery equipment,</p> <p>7. Elementary surveying equipment.</p> <p>C. CROP PRODUCTION</p> <p>1. Seeds, seedlings, fruits and storage organs of crops.</p> <p>2. Main pests and diseases of crops</p> <p>3. Planting dates, seed rates, plant population and seed quality tests of the more common local crop plants.</p> <p>4. Preparation of seedbeds, fertilizer application, mulching, pesticide application, watering, vegetative propagation,</p>	<p>Treatment should be confined to characteristic features which aid their dispersal; growth, habit, and their control.</p> <p>Simple treatment of</p>
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<p>germination tests etc.</p> <p>5. Forest products and by-products in the locality.</p> <p>6. Methods of propagation of horticultural plants</p> <p>7. Common weeds</p> <p>D. ANIMAL PRODUCTION</p> <p>1. Common breeds of animals and types of animals available in the locality.</p> <p>2. Major internal organs of farm animals, e.g., organs of the digestive system, reproductive and excretory systems.</p> <p>3. Animal by-products</p> <p>4. Animal feeds and feeding stuffs and their local sources.</p> <p>5. Main pests and parasites of farm animals.</p> <p>6. Diseases of farm animals, their prevention and control</p>	<p>Mendelian laws of inheritance required.</p> <p>Introduction, selection and breeding should be studied.</p> <p>Minute details are not required. Study of the monogastric digestive system must include that of the birds.</p> <p>Differences between the monogastric and ruminant animals' digestive systems should be emphasized.</p> <p>Studies to include mammary glands in lactation, signs of heat and ovulation, oestrus cycle and a brief mentioning of artificial insemination.</p> <p>These should be simply treated.</p> <p>Emphasis should be placed on the effects of changes in climate on growth,</p>
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<p>7. Routine management practices in farm animals, e.g., selection of livestock and poultry for breeding, culling, ear-norching, tattooing, horn or skin branding, debeaking, dehorning, castration.</p> <p>8. Fish harvesting and preservation.</p>	<p>reproduction, milk and egg production.</p> <p>Discussion should include the extensive, intensive and semi-intensive systems of management.</p> <p>Study of the biochemical details of the nutrients is not required. Hay and silage should be mentioned.</p> <p>The types of diet for the various classes of animals and their characteristics should be studied. However minute details of ration formulation are not required. Concept of supplementary feeding/diet should be explained.</p> <p>Malnutrition should be defined. Nutrient disorders such as ketosis and nutrient deficiency symptoms such as rickets and others should be simply covered.</p> <p>Discussion should include factors</p>
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	<p>affecting level of production of herbage: rainfall, grass/legume composition and grazing.</p> <p>Study to include weeds removal and burning. Pest and disease control etc.</p> <p>Discussion should include importance of quarantine, immunization, hygiene, breeding for resistance. The economic importance of all the diseases should be studied.</p>
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	<p>Role of vectors/parasites: tsetsefly and ticks in the transmission of livestock diseases should be mentioned.</p> <p>Dipping, drenching, spraying and deworming as methods of control should also be studied.</p> <p>A review of types, classification, processing, preservation and uses of fish is important.</p> <p>Study to include aeration, stocking, feeding, harvesting and processing.</p> <p>Study should include differences and similarities between</p>
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	<p>breeds e.g., local, exotic and cross (hybrids) and performances of animals. Inbreeding, line breeding and cross-breeding should also be mentioned.</p> <p>This should be treated as an instrument of breeding with emphasis on its disadvantages and advantages.</p> <p>Importance of rural-urban migration and how it affects labour availability in agricultural production should also be studied.</p> <p>Examples of how they affect agricultural production should be emphasized.</p> <p>Simple treatment of the sources of credit is required. Note that financing covers credits and subsidies. Problems of getting loans from each</p>
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	<p>source should be explained e.g., collaterals, interest, payments etc.</p> <p>Discussion should include terms such as appreciation, farm budget, inventory, depreciation, salvage value; their importance and their uses in calculating profit and loss of farm items like crops, livestock, farm machinery and tools in the farm.</p> <p>Discussion to include merits and demerits of various agents. Marketing channels of farm produce and problems associated with them should be studied.</p> <p>Concepts, objectives and importance of extension in agriculture. The role of the Universities, Ministry of</p>
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	<p>Agriculture and Farmers' Associations in extension education. The current problems and issues in extension education. Qualities of good extension personnel should be studied.</p> <p>Mass media, pamphlets, demonstration plots, group meeting with farmers, farm cooperative societies, etc.</p> <p>Study should include Agricultural Development Programmes (ADP), Agro-service centres, Agricultural Ministries, Farm Settlement Schemes etc.</p> <p>Soil samples are to be examined for texture by manual feeling of wet and dry soil. Examination of fertile and infertile soils and note distinguishing features of soils – colour, texture and structure, presence of organic matter and living things.</p> <p>Simple description and</p>
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	<p>identification of soil profile and visits to excavation sites and dugout pits.</p> <p>Common rock types of igneous, sedimentary and metamorphic origins. Visits and collections of various types of rocks and their identification for laboratory use.</p> <p>Simple laboratory experiment required e.g., displacement of cation with potassium.</p> <p>Common types of nitrogen, phosphorus and potassium fertilizers. Candidates should know their rates and how N.P.K. can be compounded on the farm.</p>
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	<p>Simple demonstration of compost and farmyard manure preparation.</p> <p>Simple demonstration on how to carry out irrigation and drainage practices. Identification and uses of irrigation and drainage equipment e.g., water-can, sprinkler, pump, pipes etc.</p> <p>Identification, description, uses and maintenance of various garden tools and equipment e.g., hoe, cutlass, garden trowel, hand fork, shovel, spade, rake, sickle, secateurs, shears, long handle hoe, pruner, budding knife, emasculator etc.</p> <p>Identification, description and uses of tractor-and animal-drawn implements e.g., ploughs, harrows, ridgers, planters, cultivators, etc. identification of the major parts of the implements and their functions. Maintenance.</p> <p>Identification, description and uses of harvesting, processing</p>
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	<p>and storage equipment e.g., dehuskers, shellers, winnowers, solar dryers, processors, graters, refrigerators, cutlass, scythe, groundnut lifters etc.</p> <p>Identification of the major components of the farm-tractor. Operation, servicing and maintenance of tractor.</p> <p>Uses and maintenance of the following should be demonstrated : shears, dibber, pruning knife, secateurs, budding knife, measuring tapes, handfork, hand trowel, hoe, fork etc.</p> <p>Identification, description, uses and care of livestock and fishery equipment e.g., waterers, feeders, milking machines, crawlers, nets, hook and line, branding machine, egg candler etc.</p> <p>Identification, uses and care of simple surveying equipment e.g., measuring tape, pins or arrows, ranging poles, plumb bob, offset staff, compass, chains, pegs, theodolite etc. Demonstration of simple farm layout</p>
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	<p>survey method.</p> <p>Identification of seeds, seedlings, fruits, storage organs and essential parts of the common crop plants, pasture grasses, legumes.</p> <p>Recognition of the main field and storage pests and the damage they do to crops e.g., cotton stainer, yam beetles, weevils etc. Recognition of main diseases of crops, their causal agents and characteristic symptoms, prevention and control.</p> <p>Activities should include the following propagation methods – direct sowing, transplanting, layering, grafting and budding.</p> <p>Emphasis on external features and mode of dispersal. Demonstration of</p>
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	<p>various methods of weed control on the farm.</p> <p>Identification of breeds, methods of restraints, handling and grooming of farm animals are required.</p> <p>Identification and functions of the major internal organs. Microscopic details not required.</p> <p>Identification of animal by-products, e.g., hides and skins, furs, feathers, horns.</p> <p>Recognition of and comments on the uses of main feeds and animal feeding stuffs. Types of diets/ration. Feed stuffs, e.g., fish meal, cakes, rice bran.</p> <p>Recognition of main ectoparasites, e.g. ticks, lice, and endoparasites e.g. tapeworms, liver flukes, roundworms. The damages caused on their hosts and their control. The life cycles of the parasites should be noted.</p> <p>Methods of prevention and control of diseases</p>
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	<p>of farm animals, e.g., drugging, drenching, dipping, spraying and simple methods of farm sanitation should be demonstrated.</p> <p>Students should be familiar with the equipment/tool used for these practices.</p> <p>Recognition of various methods of harvesting, processing and preservation of fish.</p>
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