

MOKSHA

Mains Oriented Knowledge Sharing & Assessment

UPSC - AGRICULTURE (Chennai)
MAINS 2024
TEST BATCH
(Offline | Online)

Admissions from **16th June, 2023**
Courses start from **21st June, 2023**



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AGRICULTURE OPTIONAL TEST SCHEDULE 2024



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Features:

- Consistently producing **UPSC Toppers** for the last 8 years.
- Carefully designed test schedule to achieve **300+** in the Optional paper.
- There will be total **20 Tests** divided into (**14 Sectional test and 6 Full Syllabus Tests**)
- **More than 70% of the questions** reflected in CSE 2022 (Comparison Chart given on the last page)
- All the test papers are equivalent with the UPSC Mains exam pattern
- Detailed Answers for all questions and Model Answers of Faculty will be provided
- Toppers' Answer copy will be shared in the test batch telegram channel.
- One-to-one feedback with Faculty
- Answer writing strategy and answers for all tests will be discussed after every test.
- Fee – Rs.8,500 for New Students. Rs.6,500 for Old Students.
- Test Timing – 4 – 7 P.M. (Every Friday)
- Discussion Timing – 7.30 to 8.30 P.M. (After Test)

Some of our recent Toppers....

- Devi Priya Ajith – AIR - 573 (CSE 2022)
- Ramakrishna Saran – AIR – 689 (CSE 2022)
- Swathi Sree T – AIR – 42 (CSE 2021)
- Kaaviya – AIR – 38 (IFoS 2021)
- Menaga – AIR – 56 (IFoS 2021)
- Valli – AIR – 77 (IFoS 2021)

Test Schedule

Test No	Date	Detailed Syllabus	Reference Books
	21.06.2023 6.30 to 8.30 P.M.	Test Series Orientation Session – I Quick Introduction of Syllabus Topics, Orientation on latest trends in Questions	
	28.06.2023 6.30 to 8.30 P.M.	Test Series Orientation Session – II Basics of answer writing - Value Additions, presentation, incorporating current affairs, etc.,	
1.	07.07.2023	Ecology and Environment <ul style="list-style-type: none"> ▪ Ecology and its relevance to man, natural resources, their sustainable management and conservation. ▪ Physical and social environment as factors of crop distribution and production. ▪ Agro ecology; cropping pattern as indicators of environments. ▪ Environmental pollution and associated hazards to crops, animals and humans. ▪ Climate change—International conventions and global initiatives. ▪ Green house effect and global warming. 	Agriculture Optional by R.Kanagaraj Or Ecology and Environment - P.D.Sharma ▪ NCERT – 12 th Biology Chapter Ecology

- Advance tools for ecosystem analysis—Remote Sensing (RS) and Geographic Information Systems (GIS).

2. 14.07.2023

Cell Biology and Genetics

- Cell structure, function and cell cycle.
- Synthesis, structure and function of genetic material.
- Laws of heredity.
- Chromosome structure, chromosomal aberrations.
- Linkage and cross-over, and their significance in recombination breeding.
- Cytoplasmic inheritance
- Sex-linked, sex-influenced and sex-limited characters.

**Agriculture
Material
by
R.Kanagaraj**

Or

- Fundamentals of Genetics – B.D. Singh

3. 21.07.2023

Cropping System

- Cropping patterns in different agro-climatic zones of the country.
- Impact of high-yielding and short duration varieties on shifts in cropping patterns.
- Concepts of various cropping, and farming systems.
- Organic and Precision farming.

**Agriculture
Material
by
R.Kanagaraj**

- Agritech portal by TNAU for Package of Practices
- Principles of Agronomy – Yellamandha Reddy

		<ul style="list-style-type: none"> Package of practices for production of important cereals, pulses, oil seeds, fibres, sugar, commercial and fodder crops. 		
4.	28.07.2023	Plant Breeding -I	<ul style="list-style-type: none"> History of plant breeding. Modes of reproduction, Selfing and crossing techniques. Origin, evolution and domestication of crop plants, Centre of origin, law of homologous series, Crop genetic resources - conservation and utilization. Application of principles of plant breeding, improvement of crop plants. Polyploidy, euploids and aneuploids. Mutation and their role in crop improvement. Heritability, sterility and incompatibility, classification and their application in crop improvement. 	<p>Agriculture Material R.Kanagaraj</p> <p>Or</p> <p>Plant Breeding Principles and Methods – B.D.Singh</p>
5.	04.08.2023	Plant Breeding and Plant Biotechnology -II	<ul style="list-style-type: none"> Molecular markers and their application in plant improvement. Pure-line selection, pedigree, mass and recurrent selections, 	<p>Agriculture Material R.Kanagaraj</p> <p>Or</p>

		<ul style="list-style-type: none"> ▪ Combining ability, its significance in plant breeding. ▪ Heterosis and its exploitation. ▪ Somatic hybridization. ▪ Breeding for disease and pest resistance. ▪ Role of interspecific and intergeneric hybridization ▪ Role of genetic engineering and biotechnology in crop improvement Genetically modified crop plants. 	Plant Breeding Principles and Methods – B.D.Singh
6.	11.08.2023	<p style="text-align: center;">Weed Science</p> <ul style="list-style-type: none"> • Weeds, their characteristics, dissemination and association with various crops; their multiplications; • Cultural, biological, and chemical control of weeds. <p style="text-align: center;">Forestry</p> <ul style="list-style-type: none"> • Important features and scope of various types of forestry plantations such as social forestry, agroforestry, and natural forests. • Propagation of forest plants. • Forest products. • Agroforestry and value addition. • Conservation of forest flora and fauna. 	<p>Agriculture Optional Material by R.Kanagaraj</p> <p style="text-align: center;">Or</p> <ul style="list-style-type: none"> ▪ Agritech portal by TNAU ▪ Principles of Agronomy – Yellamandha Reddy ▪ ICAR – E-courses Agriculture website
7.	18.08.2023	<p style="text-align: center;">Seed Technology</p> <ul style="list-style-type: none"> ▪ Seed production and processing technologies. 	<p>Agriculture Optional Material by R.Kanagaraj</p>

- Seed certification, Seed testing and storage.
- DNA finger printing and seed registration.
- Role of public and private sectors in seed production, and marketing.
- Intellectual Property Rights (IPR) issues
- WTO issues and its impact on Agriculture.

Or

Seed Technology –
R.L.Agarwal

8. 25.08.2023

Soil Science

- Soil—physical, chemical and biological properties.
- Processes and factors of soil formation.
- Soils of India.
- Mineral and organic constituents of soils and their role in maintaining soil productivity

Soil and Water Conservation and Dryland Agriculture

- Soil conservation, integrated watershed management.
- Soil erosion and its management.
- Dry land agriculture and its problems.
- Technology for stabilising agriculture production in rainfed areas.

**Agriculture Optional
Material by
R.Kanagaraj**

Or

- Principles of Agronomy –
Yellamandha Reddy

- Introductory Soil Science – Dilip Kumar Das

9.	01.09.2023	Plant Physiology - I	Agriculture Optional Material by R.Kanagaraj
		<ul style="list-style-type: none"> ▪ Principles of Plant Physiology with reference to plant nutrition, absorption, translocation and metabolism of nutrients. ▪ Soil-water-plant relationship. ▪ Growth and development; photoperiodism and vernalization. ▪ Plant growth substances and their role in crop production. ▪ Physiology of seed development and germination; dormancy. ▪ Stress physiology—drought, salt and water stress. 	<p style="text-align: center;">Or</p> <p>Fundamentals of Plant Physiology – V.K.Jain</p>
10.	08.09.2023	Plant Physiology - II	Agriculture Optional Material by R.Kanagaraj
		<ul style="list-style-type: none"> ▪ Enzymes and plant pigments; ▪ Photosynthesis—modern concepts and factors affecting the process, ▪ Aerobic and anaerobic respiration; ▪ C3, C4 and CAM mechanisms. ▪ Carbohydrate, protein and fat metabolism. 	<p style="text-align: center;">Or</p> <p>Fundamentals of Plant Physiology – V.K.Jain</p>

11.	15.09.2023	Nutrient Management	Agriculture Material R.Kanagaraj	Optional by
		<ul style="list-style-type: none"> ▪ Essential plant nutrients and other beneficial elements in soils and plants. ▪ Principles of soil fertility, soil testing and fertiliser recommendations. ▪ Integrated nutrient management ▪ Biofertilizers ▪ Losses of nitrogen in soil, nitrogen-use efficiency in submerged rice soils, nitrogen fixation in soils. ▪ Efficient phosphorus and potassium use. ▪ Problem soils and their reclamation. ▪ Soil factors affecting green house gas emission. 	<p style="text-align: center;">Or</p> <ul style="list-style-type: none"> • Principles of Agronomy – Yellamandha Reddy • Introductory Soil Science – Dilip Kumar Das 	
12.	22.09.2023	Horticulture	Agriculture Material R.Kanagaraj	Optional by
		<ul style="list-style-type: none"> ▪ Major fruits, plantation crops, vegetables, spices and flower crops. ▪ Package practices of major horticultural crops. ▪ Protected cultivation and high tech horticulture. ▪ Post-harvest technology and value addition of fruits and vegetables. ▪ Landscaping and commercial floriculture. ▪ Medicinal and aromatic plants. 	<p style="text-align: center;">Or</p> <ul style="list-style-type: none"> • Introduction to Horticulture – N.Kumar 	

Role of fruits and vegetables in human nutrition.

- Hand Book of Horticulture - ICAR

13. 29.09.2023

Irrigation Management

- Water-use efficiency in relation to crop production,
- Criteria for scheduling irrigations,
- Ways and means of reducing run-off losses of irrigation water.
- Rainwater harvesting.
- Drip and sprinkler irrigation.
- Drainage of water-logged soils,
- Quality of irrigation water,
- Effect of industrial effluents on soil and water pollution.
- Irrigation projects in India.

Agriculture Optional Material by R.Kanagaraj

Or

- Principles of Agronomy – Yellamandha Reddy

14. 06.10.2023

Entomology and Pathology

- Diagnosis of pests and diseases of field crops, vegetables, orchard and plantation crops and their economic importance.
- Classification of pests and diseases and their management.
- Integrated pest and diseases management.
- Storage pests and their management.
- Biological control of pests and diseases.

Agriculture Optional Material by R.Kanagaraj

Or

- Plant Pathology – R.S.Mehrotra
-

- Epidemiology and forecasting of major crop pests and diseases.
- Plant quarantine measures.
- Pesticides, their formulation and modes of action.
- Elements of Economic Entomology – Vasantharaj David
- ICAR – E-courses Agriculture website
- Agritech Portal by TNAU

15. 13.10.2023

Farm Management

- Farm management, scope, importance and characteristics,
- Farm planning. Optimum resource use and budgeting.
- Economics of different types of farming systems.
- Marketing management strategies for development,
- Market intelligence.
- Price fluctuations and their cost;
- Role of co-operatives in agricultural economy;
- Types and systems of farming and factors affecting them.
- Agricultural price policy.
- Crop Insurance.

Agriculture Optional Material by R.Kanagaraj

Or

- Economics of Farm Production and Management – VT Raju

Agricultural Extension

- Agricultural extension, its importance and role,
- Methods of evaluation of extension programmes,

- Socio-economic survey and status of big, small and marginal farmers and landless agricultural labourers;
 - Training programmes for extension workers.
 - Role of Krishi Vigyan Kendra's (KVK) in dissemination of Agricultural technologies.
 - Non-Government Organisation (NGO) and self-help group approach for rural development.
- Hand Book of Agricultural Extension – ICAR
 - ICAR – E-courses Agriculture website

16. 20.10.2023

Food Production and Food Security

Food production and consumption trends in India. Food security and growing population – vision 2020. Reasons for grain surplus. National and international food policies. Production, procurement, distribution constraints. Availability of food grains, per capita expenditure on food. Trends in poverty, Public Distribution System and Below Poverty Line population, Targeted Public Distribution System (PDS), policy implementation in context to globalization. Processing constraints. Relation of food production to National Dietary Guidelines and food consumption pattern. Food based dietary approaches to eliminate hunger. Nutrient deficiency – Micronutrient deficiency: Protein Energy Malnutrition or Protein Calorie Malnutrition (PEM or PCM), Micro nutrient deficiency and

Agriculture Optional Material by R.Kanagaraj

Or

Internet Sources and Economic Survey

HRD in context of work capacity of women and children.
Food grain productivity and food security.

17.	03.11.2023	Full Test Paper - I
18.	17.11.2023	Full Test Paper - II
19.	01.12.2023	Full Mock Test Fore Noon - Paper I After Noon – Paper II
20.	15.12.2023	Full Mock Test Fore Noon - Paper I After Noon – Paper II

The Most Comprehensive Material for Agriculture Optional

UPSC AGRICULTURE OPTIONAL NOTES

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Compiled by

R.KANAGARAJ, B.SC., (AGRI)
Faculty, Agriculture
Shankar IAS Academy

UPSC AGRICULTURE OPTIONAL NOTES

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Compiled by

R.KANAGARAJ, B.SC., (AGRI)
Faculty, Agriculture
Shankar IAS Academy

Shankar IAS Academy Mainstorming Agriculture Optional Test Series

Questions Reflection in 2022 Mains

More than 75% of our test series questions reflected in UPSC 2022 Mains

Paper I

Mainstorming Questions – 2022	UPSC 2022
Test 1 Q.No.2(c) – Explain the utility of GIS in Agriculture	1. a) What is GIS? Discuss its elements and prospects in Agriculture.
Test 1 Q.No.3 (a) What do you mean by precision farming? Give an account of smart agricultural technologies used in precision farming.	1. b) What is precision farming? Write its different aspects for resource conservation
Test 1 Q.No.5.c) Describe major biological control method of weeds Full mock test Q.No.1 (e) Write a short note on Bioherbicides.	1. d) Discuss selection criteria of successful bioagent and bioherbicides. State atleast two examples of biocontrol of weeds.
Test 3 Q.No.6 a) What are the ways in which nitrogen can be lost in soil? How to avoid its loss from applied fertilizers in soil?	1. e) How to enhance nitrogen use efficiency in transplanted rice?
Full mock Test Q.2 (a) Discuss the role of forests in an ecosystem and the strategy for the conservation of forest flora and fauna	2. c) Discuss the various steps for long term conservation of forest flora and fauna
Full mock Test Q.8 (a) What is the status of millets production and constraints of their production in India? How millets will ensure climate resilient agriculture and nutritional security?	3. c) Describe the importance of millets in Indian Agriculture
Test 1 Q.No.7(c) Write short note on herbicide resistance by weeds	3. a) Discuss about the types of herbicide resistance in weeds.

<p>Test 3 Q.No.6.b) Differentiate between soil structure and soil texture. Write their significance in crop production.</p>	<p>4. b) Soil structure an important soil property for crop production.</p>
<p>Full mock Test Q.1. (a) Agroforestry is a better land use system for climate change mitigation and adaptation. Justify</p>	<p>4. c. Describe various components of agroforestry and state the benefits of agroforestry</p>
<p>Test 6 Q.5. b) Write the role of Farmers' Producer Organisations (FPOs) in Agricultural Marketing 7) (a) Discuss the significance of Self-Help Groups for rural development with successful examples.</p>	<p>4. a) Self Help Groups and Farmer Producer Organisations (FPO)</p>
<p>Test 3 Q.No.3.c) Write about soil health card scheme</p>	<p>b) Kisan Credit Card and Soil health Card</p>
<p>Test 3 Q.No.5 e) Write a short note on contour bunding to prevent soil erosion.</p>	<p>c) Contour bunding and Graded bunding</p>
<p>Test 3 Q.No.3.b) Define Watershed. Enlist various components of Watershed. Discus its role in Dry land agriculture.</p>	<p>d) Rainwater harvesting and Watershed management</p>
<p>Test 6 Q.No.5.c) Discuss the role of NGOs and Private players in Agricultural Extension Q.7.c) Discuss cooperative marketing with successful case studies.</p>	<p>e) Cooperative societies and Non-Government organisations (NGOs)</p>
<p>Full mock test 8.(c) Discuss the role of Krishi Vigyan Kendras (KVK) in transfer of technologies to end users.</p>	<p>6) a) What role KVKs can play to reach target groups</p>
<p>Test 3 Q.5. a) Importance of contingency cropping</p>	<p>6) b) Narrate various components of contingent crop planning in dry land agriculture</p>

<p>Full mock test Q.5.(a) Explain the Contingent crop production in dryland agriculture</p>	
<p>Test 6 Q.4 (a) Discuss the problems of agricultural marketing in India and give solutions. Q.4. (b) What is market intelligence? Write the importance and drawbacks of market intelligence in India. Give suggestions for better market intelligence.</p>	<p>6 c) Enlist the problems of agricultural marketing in India and also describe the role of marketing intelligence in addressing these problems.</p>
<p>Full mock Test Q.7(a) What are the components of drip irrigation system? Write the benefits of drip-fertigation.</p>	<p>7) a) Discuss about Micro-Irrigation systems and their advantages in Indian Agriculture</p>
<p>Test 6 Q.No.2.c. What are the various parameters used to assess the quality of Irrigation water?</p>	<p>8.a) Discuss the various parameters of quality of irrigation water.</p>
<p>Test 3 Q.2. b) List out the different groups of Bio fertilizers and give reasons behind little popularization of bio-fertilizers in India.</p>	<p>8.b.) Describe various types of biofertilizers</p>
<p>Test 6 Q.1.(e) Write about crop insurance schemes in India</p>	<p>8.c.) Describe the importance of crop insurance for small and marginal framers</p>

Shankar IAS Academy Mainstorming Agriculture Optional Test Series

Questions Reflection in 2022 Mains

Paper II

Mainstorming Questions – 2022	UPSC 2022
Test 1 Q.No.4(c) What is polyploidy? Briefly discuss the applications of Allopolyploidy in crop improvement.	1. a) What is Polyploidy? Give a brief account of classification of polyploids.
Test 4 (a) Differentiate between the following:- i) Vertical Resistance and Horizontal Resistance	1.c. What do you understand by the horizontal and vertical disease resistance in crop plants
Test 5 Q.No.1 c) Briefly describe water potential. What are the factors affecting it?	1. e) Define matric potential, osmotic potential and turgor potential and their interrelationship with water potential.
Test 2 Q.5 (b) Distinguish between Heterochromatin and Euchromatin. Write the genetic significance of chromosomes	1. a) Discuss the structure of a plant chromosome and its role in genetic diversity
Test 4 Q.No.1(c) Write short notes on the following:- a) Law of Parallel Variation	2. b. Discuss the concept of centre of origin of crop plants and their role in plant breeding.
Test 2 Q.3 (a) Define mutation. Discuss its role in crop improvement.	3. a) What is mutation. Significance of Induced mutation in plant breeding
Test 2 Q.No.2(b) What do you understand by 'genetically modified crop plants'? Give an account of their uses in management of insect-pests, diseases and weeds.	2. b) Describe in brief the applications of genetic engineering for insect and herbicide resistance.
Full mock Test Q.No.1.(b) Sui generis protection of traditional knowledge	3. c. Sui generis protection of traditional knowledge

<p>Test 5 Q.No.3 (c) Explain the ion exchange mechanism of absorption of mineral salts.</p>	<p>4. a) Describe the mechanism of absorption and translocation of mineral nutrition in plants</p>
<p>Test 2 Q.1. e) Write short notes on the following: - iii) Aneuploids</p>	<p>4. b) Define aneuploidy. Discuss its applications</p>
<p>Test 4 Q.No.6(c) Discuss the applications of somatic hybridization.</p>	<p>3. c) Explain the techniques involved in somatic hybridization of crop plants</p>
<p>Full mock Test Q.No.8 (c) Goal 2 of the Sustainable Development Goals Agenda 2030 aspires to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture". In order to achieve this goal, list out the initiatives taken by the Government of India.</p>	<p>5. e) Efforts of GOI in streamlining poverty.</p>
<p>Test 7 Q.No.1(a) What is Protein Energy Malnutrition? Discuss the socio economic factors of malnutrition in India</p>	<p>6.a) Policy instruments for combating malnutrition.</p>
<p>Test 7 Q.7(b) Discuss the strategies for management of pesticide residues.</p>	<p>6.b) Pesticide usage with reference to purchase, handling, application and disposal.</p>
<p>Test 7 Q.4.(b) What are the agronomic methods of pest management? Describe with suitable examples. Q.8.(a) Give an account of biological control of crop pests and diseases.</p>	<p>8) b) Describe various methods of pest control with appropriate examples</p>
<p>Test 7 Q.7. (c) What do you understand by the term Food security? Discuss the measures taken by the government to ensure food security?</p>	<p>8) c) What is food security? Why is it essential? Current food security system.</p>

Centres

Anna nagar

☎ **76677 66266**

No 259, AL Block, 4th Avenue, Shanthi Colony,
Anna Nagar, Chennai-600040

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No-34, 2nd stage,
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Chandra layout bus stand road,
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No.207/5 United Arcade,Kauveri Avenue,
State Bank Colony, Junction Main Road,
Salem-636 004

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☎ **97896 64555**

N.R.Towers, A9(N),
Salai Road Thillai Nagar,
Trichy-620 018.

for enquiry:

✉ optionalonline@shankarias.in
