

AGRICULTURE SCIENCE AND TECHNOLOGY

Standard XI



The Constitution of India

Chapter IV A

Fundamental Duties

ARTICLE 51A

Fundamental Duties- It shall be the duty of every citizen of India—

- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities, to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;
- (k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

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Subject Committee:

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Dr. Naikare Shriram Maruti

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Shri. Ubale Nandkumar Giridhar

Shri. Rajiv Arun Patole

(Member Secretary)

Production :

Shri Sachchitanand Aphale

Chief Production Officer

Shri Prashant Harne

Production Officer

Coordinator :

Shri. Rajiv Arun Patole

**Special Officer
(Agriculture Science and Technology)**

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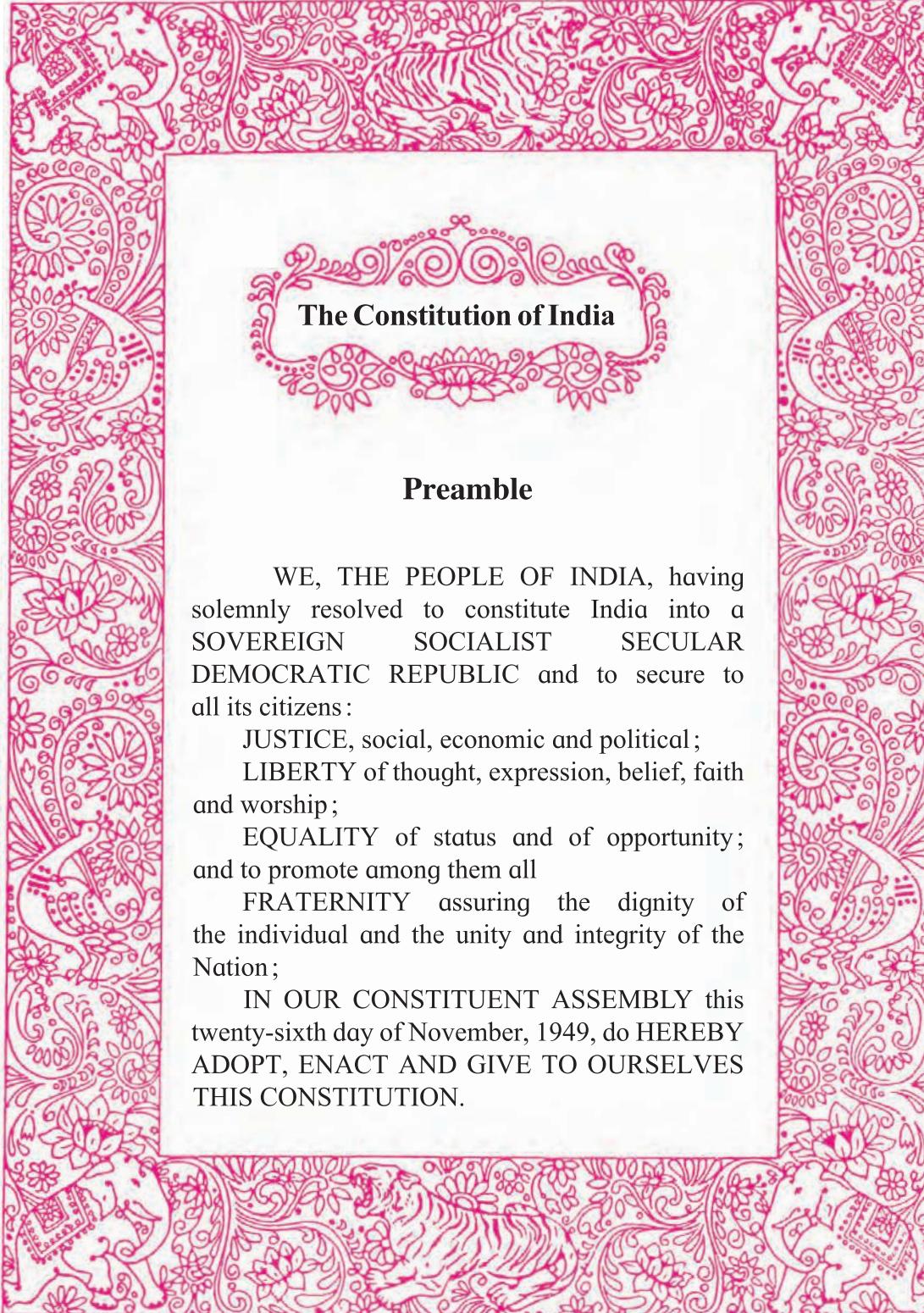
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The Constitution of India

Preamble

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā
Drāvida-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā^ā
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,
Jaya jaya jaya, jaya hē.

PLEDGE

India is my country. All Indians
are my brothers and sisters.

I love my country, and I am proud
of its rich and varied heritage. I shall
always strive to be worthy of it.

I shall give my parents, teachers
and all elders respect, and treat
everyone with courtesy.

To my country and my people,
I pledge my devotion. In their
well-being and prosperity alone lies
my happiness.

Preface

Dear students,

Welcome to std. XI. We have great pleasure in offering to you textbook of agriculture science and technology based on the new syllabi. This textbook is designed to get you prepared for higher studies. The information and skill from this textbook will also help to develop entrepreneurship qualities.

The educational science understands a paradigm shift in our country. The student community is waiting for exploring new vistas to meet the demands and challenges. It was necessary to bring a change at +2 level of education. This stage deals with adolescents, who are hungry for knowledge and are sensitive as well. Efforts are made to make this text compatible and digestible for this age group.

The world as well as Indian population is ever increasing. Hence, it is imperative to boost up production. This problem can be turned into opportunity by developing skilled manpower to utilize the available resources for food security. Agriculture education can meet this challenge. New technologies have to be evolved and taken from lab to land for sustained yield. The present book on agriculture is to serve as a source of information covering maximum aspects, which can help understand the topics with eagerness to study further higher courses.

While studying this textbook the section ‘can you recall’ ‘recall a little’ and ‘can you tell’ are used for revision. Many activities given under the titles ‘observe and discuss’ and ‘try this’ ‘use your brain power’ think about it’ etc. will stimulate power of thinking. Ask your teachers, parents and classmates for help wherever you need it.

QR code is given by using you can get additional audio – visual information as supporting articles. The students from rural area, enrolling for this subject will certainly get advanced knowledge of agriculture, thereby they will educate their parents for the same advanced techniques of farming.

While studying the book make proper use of devices of information communication technology, which will make studies much easier. The efforts taken to prepare the textbook will not only enrich the learning experiences of the students, but also benefit other stakeholders such as teachers, parents as well as candidates appearing for the competitive examinations.

We look forward to a positive response from the teachers and students.

Our best wishes to all!



(Dr. Sunil Magar)

Director

Maharashtra State Bureau of Textbook
Production and Curriculum Research, Pune.

Pune

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Competency Statements

Unit I Elements of Agriculture	<ul style="list-style-type: none"> • Explain definition of rock, mineral and soil. • Classify rocks according to mode of formation and on the basis of chemical composition, classification of minerals • Observe and explain the physical, chemical and biological properties and functions of soil, explain soil health and distinguish soil fertility and productivity. • Explain and draw flow charts of weathering of rocks and formation of true soil. • Explain weather and climate with their elements such as temperature, rainfall, light, wind, humidity, dew, fog, frost and their effect on plant growth. Understand weather forecasting. • Use thermometer, thermograph, sunshine recorder, hygrometer, dew gauge, wind vane, anemometer, rain gauge. • Understand technologies, innovations and education regarding the modern agricultural approaches.
Unit II Seed and Sowing	<ul style="list-style-type: none"> • Define seed and explain its parts. • Differentiate between seed and grain. • Explain the characteristics of good quality seed. • Elaborate stages of seed multiplication. • Elaborate seed germination-definition, types, factors affecting germination, seed dormancy, methods of breaking dormancy. • Explain a procedure of germination tests, physical purity, seed heath, moisture and vigour and viability tests. • Explain information regarding sowing time, depth, spacing and seed treatment. • Use methods of sowing such as broadcasting, drilling, dibbling, planting, sowing in plough furrows and transplanting.
Unit III Needs of Plants	<ul style="list-style-type: none"> • Classify essential elements with examples. • Prepare chart on Functions and deficiency symptoms of nutrients • Explain about, manures, fertilizers and methods of application. • Elaborate different advantages of irrigation and adverse effect of irrigation with examples. • Explain the systems of irrigation like surface, subsurface, sprinkler, drip. • Collect Information regarding when to, how and how much to irrigate. • Explain meaning, importance, causes of improper drainage and remedies. • Explain watershed and watershed management. • Identify the macro, micro, mini, mili watershed. • Elaborate main components of watershed management. • Learn various steps in watershed management. • Explain the processes of rainwater, ground water and roof water harvesting.

Unit IV Cultivation Management	<ul style="list-style-type: none"> Explain and compare different types of cropping system viz.- monoculture, multiple cropping, mixed cropping, inter cropping, strip cropping, relay cropping, sequence cropping, multistoried cropping and catch cropping. Explain tillage, tilth and objectives of tillage. Explain Preparatory tillage, seedbed preparation, inter-cultivation, meaning, examples and list of tillage implements. Understand minimum tillage, zero tillage and mulching. Explain harvesting, threshing, winnowing, storage. Define weed with characteristics. Classify weed according to different aspects-life cycle, place of occurrence, plant family, dependence on hosts, soil types, morphology, origin, nature of stem and association. Explain beneficial and harmful effects of weed and understand weed dispersal. Explain preventive, curative and integrated weed management.
Unit V Crop Production Management	<ul style="list-style-type: none"> Explain pest, disease and their types and controlling methods, integrated pest management (IPM), integrated disease management (IDM). Explain pest of sugarcane, cotton, paddy, soybean, mango, pomegranate, citrus, coconut, onion, potato. Identify the diseases of sugarcane, cotton, paddy, soybean, mango, pomegranate, citrus, coconut, onion, potato. Explain the nature of damage by dears, elephants, rabbits, wild boar, monkeys, and nilgai. Suggest measures to protect crops and field from wild animals. Compare world situation, Indian conditions, reasons of losses due to waste. Classify the waste into solid waste, wet waste, dry waste, domestic hazard waste, e-waste, domestic waste, commercial waste, animal waste, plant waste. Explain processes of waste management like landfill, decomposition, biogas, vermicomposting, microbial decomposition. Elaborate by-products of wastes with their nutritive value and consequences.
Unit VI Fundamentals of Horticulture	<ul style="list-style-type: none"> Explain importance, scope and present status of horticulture in India. Make decisions for selection of site, layout of orchard, planting methods and explain objectives, methods, systems, advantages, procedure of development of new orchard. Explain the process of training and pruning, high-density planting, bahar treatment, girdling, bending, ringing, notching, hardening. Understand information about plantation crops, vegetable, medicinal, spice, aromatic and exotic crops, ornamental and flower crops.

- For Teachers -

Dear Teachers,

We are happy to introduce the revised textbook of Agriculture Science and Technology for Std XI. This book is a sincere attempt to follow the maxims of learning as well as develop a ‘constructivist’ approach to enhance the quality of learning. The demand for more activity based, experiential and innovative learning opportunities is the need of the hour. The present curriculum has been restructured so as to bridge the credibility gap that exists between what is taught and what students learn from direct experience in the outside world. Guidelines provided below will help to enrich the teaching-learning process and achieve the desired learning outcomes.

- To begin with, get familiar with the textbook yourself.
- The present book has been prepared for constructivist and activity-based teaching.
- Teachers must skillfully plan and organize the activities provided in each chapter to develop interest as well as to stimulate the thought process among the students.
- Always teach with proper planning.
- Use teaching aids as required for the proper understanding of the subject.
- Do not finish the chapter in short.
- Follow the order of the chapters strictly as listed in the contents because the units are introduced in a graded manner to facilitate knowledge building.
- Ask questions on information related to trends and patterns. Efforts have been made to provide the latest data available. Teachers must explain

to the students the importance of data collection and data analysis.

- Major concepts of Agriculture Science and Technology have a scientific base and they deal with abstractions. Encourage group work, learning through each other’s help, etc. Facilitate peer learning as much as possible by reorganizing the class structure frequently.
- Teaching-learning interactions, processes and participations of all students are very necessary and so is your active guidance.
- Do not use the boxes titled ‘Do you know?’ for evaluation. However, teachers must ensure that students read this extra information.
- Information provided in boxes with the various titles should be considered for evaluation.
- Exercises provided after each unit are prepared using different parameters such as observation, co-relation, critical thinking, analytical reasoning, etc. Evaluation pattern should be based on the given parameters. Equal weightage should be assigned to all the topics. Use different combinations of questions. Stereotype questions should be avoided.
- Use QR Code given. Keep checking the QR Codes for updated information. Certain important links, websites have been given for references. In addition, a list of reference books is given. Teachers as well as the students can use these references for extra reading and in-depth understanding of the subject.

Best wishes for a wonderful teaching experience!

Contents

Sr. No.	Name of the lesson	Page No.
1.	Rock and Soil	1-11
2.	Weather and Climate	12 - 20
3.	Agriculture - A Modern Approach	21 - 33
4.	Seed	34 - 50
5.	Sowing	51 - 59
6.	Plant Nutrition	60 - 75
7.	Irrigation Management	76 - 89
8.	Cropping System	90 - 99
9.	Tillage	100 - 112
10.	Weed Management	113 - 126
11.	Pest and Disease Control	127 - 145
12.	Protection From Wild Animals	146 - 152
13.	Waste Management	153 - 162
14.	Horticultural Practices	163 - 179
15.	Special Crops	180 - 195

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