

Paddy Farmer

(Job Role)

Qualification Pack: Ref. Id. AGR/Q0101

Sector: Agriculture



17906

Textbook for Class IX

विद्यया ऽ मृतमश्नुते



एन सी ई आर टी
NCERT

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

ISBN 978-93-5292-311-3

First Edition

June 2020 Jyeshtha 1942

PD 5T SU

**© National Council of Educational
Research and Training, 2020**

₹ 115.00

*Printed on 80 GSM paper with NCERT
watermark*

Published at the Publication Division
by the Secretary, National Council
of Educational Research and
Training, Sri Aurobindo Marg, New
Delhi 110 016 and printed at SG Print
Packs Pvt. Ltd., F-478, Sector-63,
Noida - 201 301 (U.P.)

ALL RIGHTS RESERVED

- ❑ No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the publisher.
- ❑ This book is sold subject to the condition that it shall not, by way of trade, be lent, re-sold, hired out or otherwise disposed of without the publisher's consent, in any form of binding or cover other than that in which it is published.
- ❑ The correct price of this publication is the price printed on this page, Any revised price indicated by a rubber stamp or by a sticker or by any other means is incorrect and should be unacceptable.

OFFICES OF THE PUBLICATION

DIVISION, NCERT

NCERT Campus
Sri Aurobindo Marg
New Delhi 110 016

Phone : 011-26562708

108, 100 Feet Road
Hosdakere Halli Extension
Banashankari III Stage
Bengaluru 560 085

Phone : 080-26725740

Navjivan Trust Building
P.O. Navjivan
Ahmedabad 380 014

Phone : 079-27541446

CWC Campus
Opp. Dhankal Bus Stop
Panihati
Kolkata 700 114

Phone : 033-25530454

CWC Complex
Maligaon
Guwahati 781 021

Phone : 0361-2674869

Publication Team

Head, Publication Division : *Anup Kumar Rajput*

Chief Editor : *Shveta Uppal*

Chief Production Officer : *Arun Chitkara*

Chief Business Manager : *Vipin Dewan*

Production Officer : *Abdul Naim*

Cover and Layout

DTP Cell, Publication Division

FOREWORD

The National Curriculum Framework–2005 (NCF–2005) recommends bringing work and education into the domain of the curricular, infusing it in all areas of learning while giving it an identity of its own at relevant stages. It explains that work transforms knowledge into experience and generates important personal and social values, such as self-reliance, creativity and cooperation. Through work, one learns to find one's place in society. It is an educational activity with an inherent potential for inclusion. Therefore, an experience of involvement in productive work in an educational setting will make one appreciate the worth of social life and what is valued and appreciated in the society. Work involves interaction with material or other people (mostly both), thus, creating a deeper comprehension and increased practical knowledge of natural substances and social relationships.

Through work and education, school knowledge can be easily linked to learners' life outside the school. This also makes a departure from the legacy of bookish learning and bridges the gap between the school, home, community and workplace. The NCF–2005 also emphasises on Vocational Education and Training (VET) for all those children who wish to acquire additional skills and/or seek livelihood through vocational education after either discontinuing or completing their school education. VET is expected to provide a 'preferred and dignified' choice rather than a terminal or 'last resort' option.

As a follow-up of this, NCERT has attempted to infuse work across subject areas and also contributed in the development of the National Skill Qualification Framework (NSQF) for the country, which was notified on 27 December 2013. It is a quality assurance framework that organises all qualifications according to the levels of knowledge, skills and attitude. These levels, graded from one to ten, are defined in terms of learning outcomes, which learners must possess regardless of whether they are obtained through formal, non-formal or informal learning. The NSQF sets common principles and guidelines for a nationally recognised

qualification system covering schools, vocational education and training institutions, technical education institutions, colleges and universities.

It is under this backdrop that Pandit Sundarlal Sharma Central Institute of Vocational Education (PSSCIVE), Bhopal, a constituent of NCERT, has developed learning outcomes based modular curricula for vocational subjects from Classes IX to XII. This has been developed under the Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education of the Ministry of Human Resource Development.

This textbook has been developed as per the learning outcomes based curriculum, keeping in view the National Occupational Standards (NOS) for the job role and to promote experiential learning related to the vocation. This will enable the students to acquire necessary skills, knowledge and attitude.

I acknowledge the contribution of the development team, reviewers and all institutions and organisations, which have supported in the development of this textbook.

NCERT welcomes suggestions from students, teachers and parents, which will help us to further improve the quality of the material in subsequent editions.

New Delhi
June 2018

HRUSHIKESH SENAPATY
Director

National Council of Educational
Research and Training

ABOUT THE TEXTBOOK

Agriculture is an important part of India's economy. It accounts for about 18 per cent of the country's Gross Domestic Product (GDP) and occupies almost 43 per cent of India's geographical area. The Agriculture Industry employs a large number of people in both the organised and unorganised sectors. The requirement of skilled workforce in this Industry is increasing by the day. Various job roles, such as Paddy Farmer, Solanaceous Crop Cultivator, Tuber Crop Cultivator, Floriculturist–Open Cultivation, Floriculturist–Protected Cultivation, Microirrigation Technician, etc., are in demand by States for producing skilled workers.

A Paddy Farmer specialises in the cultivation of paddy crop as per the practices recommended for a particular agro-climatic zone, type of soil, rainfall pattern and climatic conditions to achieve the desired yield. This textbook for the job role of a Paddy Farmer has been developed to impart knowledge and skills through hands-on-learning experience, which forms a part of experiential learning. It focuses on the learning process of an individual. Therefore, the learning activities are student-centred rather than teacher-centred.

The textbook has been developed with the contribution of subject and industry experts, and academicians. Care has been taken to align the content of the textbook with the National Occupational Standards (NOSs) for the job role so that students acquire necessary knowledge and skills as per the performance criteria mentioned in the respective NOSs of the Qualification Pack (QP). The textbook has also been reviewed by experts to ensure that the content is not only aligned with the NOSs but is also of high quality. The NOSs for the job role of Paddy Farmer covered through this textbook are as follows:

1. AGR/N0101: Seed preparation in paddy
2. AGR/N0102: Land preparation and transplanting in paddy
3. AGR/N0103: Integrated nutrient management in paddy
4. AGR/N0106: Irrigation management in paddy

The textbook has eight Units. Unit 1 gives an introduction to paddy cultivation, its importance, climatic requirements for the cultivation of paddy and paddy growing regions. Unit 2 focuses on land preparation and planting. It includes implements used for land preparation and planting of paddy crop. Unit 3 deals with nursery preparation and transportation of paddy seedlings. Unit 4 throws an insight into the various growth stages of paddy crop. Unit 5 covers the various intercultural operations followed in paddy cultivation. Unit 6 deals with seed preparation, which includes methods of seed production, improved and indigenous rice varieties in India, and traits of rice varieties found here. Unit 7 focuses on water management in paddy. It emphasises on water requirement, methods of irrigation, alternate wetting and drying, and water use efficiency in paddy. Unit 8 deals with integrated nutrient management. It includes soil sampling and analysis, nutrient requirement and its sources, methods and time of fertiliser application, and nutrient deficiency symptoms.

We hope this textbook is useful for teachers and students, who opt for this job role. Suggestions for improving this textbook are welcome.

Rajiv Kumar Pathak
Professor
Department of Agriculture and
Animal Husbandry
PSSCIVE, Bhopal

TEXTBOOK DEVELOPMENT TEAM

MEMBERS

Anand Kumar Vishwakarma, *Principal Scientist*, ICAR–Indian Institute of Soil Science, Nabibag, Berasiya Road, Bhopal, Madhya Pradesh

Pundlik Maroti Nimje, *Former Principal Scientist*, ICAR–Central Institute of Agriculture Engineering, Bhopal, Madhya Pradesh

Ram Swaroop Meena, *Assistant Professor*, Department of Agronomy, Institute of Agriculture Science, Banaras Hindu University, Varanasi, Uttar Pradesh

R. H. Wanjari, *Senior Scientist*, ICAR–Indian Institute of Soil Science, Nabibag, Berasiya Road, Bhopal, Madhya Pradesh

Rajeew Kumar, *Assistant Professor*, Department of Agronomy, College of Agriculture, G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand

Rajesh Jatav, *Consultant* (Horticulture), Department of Agriculture and Animal Husbandry, PSSCIVE, Bhopal

Sanjay Kumar Dwivedi, *Scientist*, Department of Agronomy, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh

Satish Chandra, *Retired Additional Director General*, Indian Council of Agricultural Research, New Delhi

MEMBER-COORDINATOR

Rajiv Kumar Pathak, *Professor*, Department of Agriculture and Animal Husbandry, PSSCIVE, Bhopal

ACKNOWLEDGEMENTS

The Council expresses its gratitude to all members of the Project Approval Board and officials of the Ministry of Human Resource Development, Government of India, for their cooperation in the development of learning outcome-based curricula and courseware for various job roles in different sectors.

We are thankful to officials in the National Skill Development Agency, National Skill Development Corporation and Ministry of Skill Development and Entrepreneurship for their support.

Rajesh P. Khambayat, *Joint Director*, PSSCIVE, Bhopal, is appreciated for rendering constant support in the development of this textbook.

The contributions of our colleagues at the Department of Curriculum Studies (DCS), NCERT, and members of the textbook review team — Saroj Yadav, *Professor and Dean* (Academic), NCERT, and Ranjana Arora, *Professor and Head*, DCS, are duly acknowledged. Thanks are also due to Sunita Farkya, *Professor* and Pushp Lata Verma, *Assistant Professor* at the Department of Education in Science and Mathematics, NCERT; Dinesh Kumar, *Principal Scientist*, and Seema Sepat, *Scientist* at the Department of Agronomy, Indian Agricultural Research Institute (IARI), PUSA, New Delhi, for reviewing the textbook and giving valuable feedback.

The images used in the textbook have been sourced from Creative Commons. Dinesh Kumar of IARI, PUSA, is also thanked for providing the photographs. The photographs have been selected with care and diligence to impart a clearer understanding to learners. Care has been taken not to violate any copyright issue. The images are meant for educational purpose only and are being provided for the use of students and teachers.

Gratitude is also due to the Publication Division, NCERT, for transforming the manuscript into an attractive textbook. Thanks are due to Sweta Jha, *Editor* (contractual), for copyediting the textbook and Chanchal Chauhan, *Proofreader* (contractual), for *proofreading* the manuscript. Pawan Kumar Barriar, *DTP Operator*, Publication Division, and Nitin Kumar Gupta, Naresh Kumar and Rajshree Saini, *DTP Operators* (contractual), are appreciated for layout and design.

CONTENTS

<i>Foreword</i>	<i>iii</i>
<i>About the Textbook</i>	<i>v</i>
Unit 1: Introduction to Paddy Cultivation	1
Session 1: Importance of Paddy Cultivation	4
Session 2: Climatic Requirements and Paddy Growing Regions	9
Unit 2: Land Preparation and Planting	14
Session 1: Implements used for Land Preparation and Planting	17
Session 2: Methods of Planting in Paddy Cultivation	23
Unit 3: Nursery Preparation and Transportation	31
Session 1: Types of Nursery and Seed Sowing	31
Session 2: Weeds, Insect-pests and Disease Management in a Paddy Nursery	39
Session 3: Packaging and Transportation	42
Unit 4: Growth Stages of Paddy Plant	46
Unit 5: Intercultural Operations in Paddy	53
Unit 6: Seed Production	59
Session 1: Methods of Seed Production	59
Session 2: Improved and Indigenous Rice Varieties in India	67
Session 3: Traits of Rice Varieties	73

Unit 7: Water Management	77
Session 1: Water Requirement of Paddy	77
Session 2: Methods of Irrigation	80
Session 3: Alternate Wetting and Drying, and Water Use Efficiency	84
Unit 8: Integrated Nutrient Management	88
Session 1: Soil Sampling and Analysis	88
Session 2: Nutrient Requirement and its Sources	93
Session 3: Methods and Time of Fertiliser Application	100
Session 4: Nutrient Deficiency Symptoms in Paddy	105
<i>Answer Key</i>	110
<i>Glossary</i>	117
<i>List of Credits</i>	121