Growing Lowland Rice A Production Handbook

Rice in the Cambodian economy: past and present; Topography, climate, and rice production; Soils and rice; Rice-based farming systems; Rice ecosystems and varieties; Pest management in rice; Farm mechanization; Capture and culture ricefield fisheries in Cambodia; Constraints to rice production and strategies for improvement.

This report is the second in a series of three evaluating underexploited African plant resources that could help broaden and secure Africa's food supply. The volume describes the characteristics of 18 little-known indigenous African vegetables (including tubers and legumes) that have potential as food- and cash-crops but are typically overlooked by scientists and policymakers and in the world at large. The book assesses the potential of each vegetable to help overcome malnutrition, boost food security, foster rural development, and create sustainable landcare in Africa. Each species is described in a separate chapter, based on information gathered from and verified by a pool of experts throughout the world. Volume I describes African grains and Volume III African fruits.

This open access book is about understanding the processes involved in the transformation of smallholder rice farming in the Lower Mekong Basin from a low-yielding subsistence activity to one producing the surpluses needed for national self-sufficiency and a high-value export industry. For centuries, farmers in the Basin have regarded rice as “white gold”, reflecting its centrality to their food security and well-being. In the past four decades, rice has also become a commercial crop of great importance to Mekong farmers, augmenting but not replacing its role in securing their subsistence. This book is based on collaborative research to (a) compare the current situation and trajectories of rice farmers within and between different regions of the Lower Mekong, (b) explore the value chains linking rice farmers with new technologies and input and output markets within and across national borders, and (c) understand the changing role of government policies in facilitating the on-going evolution of commercial rice farming. An introductory section places the research in geographical and historical context. Four major sections deal in turn with studies of rice farming, value chains, and policies in Northeast Thailand, Central Laos, Southeastern Cambodia, and the Mekong Delta. The final section examines the implications for rice policy in the region as a whole.

As rice imports surge ahead of production in Ghana, increasing rice production and yields has become a priority. Annual per capita consumption of rice in Ghana grew from 17.5 kg during 1999–2001 to 24 kg during 2010–2011. President Mahama, concerned with rising importation costs, suggested that rice should be produced locally (Asare-Boadu & Syme 2014). As only 5 percent of global production is traded, local production would also protect consumers from price shocks in the world rice market (World Bank 2013). While substantial investments in national rice production have been made, local production is still not able to keep up with growing demand for rice in Ghana. This book addresses aspects of rice production in rice-growing areas of the world including origin, history, role in global food security, cropping systems, management practices, production systems, cultivars, as well as fertilizer and pest management. As one of the three most important grain crops that helps to fulfill food needs all across the globe, rice plays a key role in the current and future food security of the world. Currently, no book covers all aspects of rice production in the rice-growing areas of world. This book fills that gap by highlighting the diverse production and management practices as well as the various rice genotypes in the salient, rice-producing areas in Asia, Europe, Africa, the Americas, and Australia. Further, this text highlights harvesting, threshing, processing, yields and rice products and future research needs. Supplemented with illustrations and tables, this text is essential for students taking courses in agronomy and production systems as
well as for agricultural advisers, county agents, extension specialists, and professionals throughout the industry. Even in winter’s coldest months you can harvest fresh, delicious produce. Drawing on insights gained from years of growing vegetables in Nova Scotia, Niki Jabbour shares her simple techniques for gardening throughout the year. Learn how to select the best varieties for each season, the art of succession planting, and how to build inexpensive structures to protect your crops from the elements. No matter where you live, you’ll soon enjoy a thriving vegetable garden year-round.

International networks; Varietal improvement; Soil, crop, and water management; Pest management; Technology transfer.

Rice (Oryza sativa L.) is one of the leading food crops of the world. Demand for rice is rapidly increasing in West Africa. The Gambia imports more than 80% of its rice requirement. Local production is low and efforts to increase production are hindered by high input costs, low prices for rice, and low yields. There is an urgent need for cultivars and production technologies in the upland and lowland ecosystems that will help increase yields at lower monetary costs. Upland rice is mainly grown under a shifting cultivation system. This involves slashing and burning of virgin forest and mature fallows to acquire new and more fertile lands. Environmental concerns and increasing human density are discouraging this practice and research on permanent cropping of the land is being promoted. One strategy to facilitate cultivation of the same piece of upland rice field without yield loss and without high input of fertilizer, and herbicide is the use of low-input rice varieties. The West Africa Rice Development Association (WARDA) is developing low-input varieties primarily from selections among African varieties and exotic varieties. In a 3-year varietal screening exercise, conducted in the Gambia, cv WAB377-B-16-LB-LB and WAB56-125, bred by WARDA were found to be higher yielding and more stable than the commonly used Asian variety (Peking) at low fertilizer application rates. The low-input varieties were also found to have higher NUE than the Asian variety (Peking). In lowland rice farming, water control is the most important management practice that determines the efficacy of other production inputs. Poor drainage that keeps soil saturated is detrimental to rice and degrades soil quality. In many rice irrigation systems in The Gambia, water control is highly inefficient. Drainage mechanisms are dysfunctional or inadequate. Flooded fields are transplanted with tall, very old seedlings, usually 4--6 weeks old, and 3--4 seedlings per hill. Rice fields are kept continuously flooded until at harvest. This practice is wasteful in terms of water use efficiency, and also leads to leaching of soluble nutrients, blocks aerobic soil microbial activities and slows mineralization and nutrient release from the soil complexes. (Abstract shortened by UMI.).

First title in a major new seriesAddresses improving water productivity to relieve problems of scarcity and competition to provide for food and environmental securityDraws from scientists having a multitude of disciplines to approach this important problemIn a large number of developing countries, policy makers and researchers are increasingly aware of
the conflicting demands on water, and look at agriculture to be more effective in its use of water. Focusing on both irrigated and rain-fed agriculture, this book gives a state of the art review of the limits and opportunities for improving water productivity in crop production. It demonstrates how efficiency of water use can be enhanced to maximize yields. The book represents the first in a new series of volumes resulting from the Comprehensive Assessment of Water Management in Agriculture, a research program conducted by the CGIAR’s Future Harvest Centres, the Food and Agriculture Organization of the United Nations and partners worldwide. It will be of significant interest to those working in areas of soil and crop science, water management, irrigation, and development studies.

Rice growing soils: constraints, utilization and research needs; Rice soils of Asia: distribution and management; Classification of rice growing soils; Rice soils of Japan; Rice soils of Sri Lanka; Process of padification in Korea; Fertility management of rice soils in R.O.C. on Taiwan; Fertility capability classification of Taiwan soils; Constraints to the use of rice soils for upland crops in R.O.C. on Taiwan, with particular reference to corn; The soil taxonomy system: important rice soils of Asia.

This book presents a comprehensive account of upland rice cultivation in different states of India. Upland rice system is considered as most diverse of all rice systems and each states of the country grow different varieties under a range of management conditions and cropping patterns. The 23 chapters in the book consolidate and share the knowledge on rainfed upland rice cultivation practiced in different states. It analyzes the upland rice agro-ecosystem in different states and encompasses various aspects of integrated nutrient management, pest management, varieties available and newer technologies introduced for adoption by farmers to improve the productivity of this fragile ecosystem.


Approaches and experiences in land evaluation for irrigation; Standards used for land evaluation for various irrigation techniques; Land evaluation criteria for specific crops and soils; The application of land evaluation standards for investment in irrigation development.

This book is about the novel aspects and future trends of the hyperspectral imaging in agriculture, food, and environment. The
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topics covered by this book is hyperspectral imaging and their applications in the nondestructive quality assessment of fruits and vegetables, hyperspectral imaging for assessing quality and safety of meat, multimode hyperspectral imaging for food quality and safety, models fitting to pattern recognition in hyperspectral images, sequential classification of hyperspectral images, graph construction for hyperspectral data unmixing, target visualization method to process hyperspectral image, and soil contamination mapping with hyperspectral imagery. This book is a general reference work for students, professional engineers, and readers with interest in the subject.

The third most important cereal crop after wheat and corn, rice is a staple food for more than half of the world's population. This includes regions of high population density and rapid growth, indicating that rice will continue to be a major food crop in the next century. Mineral Nutrition of Rice brings together a wealth of information on the eco

What is rainfed lowland rice? The rainfed lowland ecosystem; The cultivars; Agronomic traits; Growth duration; Drought resistance; Submergence tolerance; Cold tolerance; Adverse soils tolerance; Disease and insect resistance; Grain quality; Selecting parents and making crosses; Managing segregating generations; Evaluating advanced breeding lines; Releasing varieties.

There is a sizeable yield gap between research and average farm yields in all rice-growing countries worldwide, with key constraints ranging from biophysical to socio-economic issues. This manual provides guidelines for the identification of biophysical constraints and suggests measures that could be taken to help boost yields in rice production.

This book includes twenty-one comprehensive chapters addressing various soil and crop management issues, including modern techniques in enhancing crop production in the era of climate change. There are a few case studies and experimental evidence about these production systems in specific locations. Particular focus is provided on the state-of-the-art of biotechnology, nanotechnology, and precision agriculture, as well as many other recent approaches in ensuring sustainable crop production. This book is useful for undergraduate and graduate students, teachers, and researchers, particularly in the fields of crop science, soil science, and agronomy.

This book is open access under a CC BY 4.0 license. By 2050, human population is expected to reach 9.7 billion. The demand for increased food production needs to be met from ever reducing resources of land, water and other environmental constraints. Rice remains the staple food source for a majority of the global populations, but especially in Asia where ninety percent of rice is grown and consumed. Climate change continues to impose abiotic and biotic stresses that curtail rice quality and yields. Researchers have been challenged to provide innovative solutions to maintain, or even increase, rice production. Amongst them, the ‘green super rice’ breeding strategy has been successful for leading the development and release of multiple abiotic and biotic stress tolerant rice varieties. Recent advances in plant molecular biology and biotechnologies have led to the identification of stress responsive genes and signaling pathways, which open up new paradigms to augment rice productivity. Accordingly, transcription factors, protein kinases and enzymes for generating protective metabolites and proteins all contribute to an intricate network of events that guard and maintain cellular integrity. In addition, various quantitative trait loci associated with elevated stress tolerance have been cloned, resulting in the detection of novel genes for biotic and abiotic stress resistance. Mechanistic understanding of the genetic basis of traits, such as N and P use, is allowing rice researchers to engineer nutrient-efficient rice
varieties, which would result in higher yields with lower inputs. Likewise, the research in micronutrients biosynthesis opens doors to genetic engineering of metabolic pathways to enhance micronutrients production. With third generation sequencing techniques on the horizon, exciting progress can be expected to vastly improve molecular markers for gene-trait associations forecast with increasing accuracy. This book emphasizes on the areas of rice science that attempt to overcome the foremost limitations in rice production. Our intention is to highlight research advances in the fields of physiology, molecular breeding and genetics, with a special focus on increasing productivity, improving biotic and abiotic stress tolerance and nutritional quality of rice.

Chemical fertilizers have had a significant impact on food production in the recent past, and are today an indispensable part of modern agriculture. On the other hand, the oil crisis of the 1970s and the current Middle East problems are constant reminders of the vulnerability of our fossil fuel dependent agriculture. There are vast areas of the developing world where N fertilizers are neither available nor affordable and, in most of these countries, balance of payment problems have resulted in the removal of N fertilizer subsidies. The external costs of environmental degradation and human health far exceed economic concerns. Input efficiency of N fertilizer is one of the lowest and, in turn, contributes substantially to environmental pollution. Nitrate in ground and surface waters and the threat to the stability of the ozone layer from gaseous oxides of nitrogen are major health and environmental concerns. The removal of large quantities of crop produce from the land also depletes soil of its native N reserves. Another concern is the decline in crop yields under continuous use of N fertilizers. These economic, environmental and production considerations dictate that biological alternatives which can augment, and in some cases replace, N fertilizers must be exploited. Long-term sustainability of agricultural systems must rely on the use and effective management of internal resources. The process of biological nitrogen fixation offers an economically attractive and ecologically sound means of reducing external nitrogen input and improving the quality and quantity of internal resources. In this book, we outline sustainability issues that dictate an increased use of biological nitrogen fixation and the constraints on its optimal use in agriculture.

The importance of the sustainability of rice farming; The origins and history of rice farming; Rice farming today; The biophysical basis of the sustainability of rice farming; Maintaining the nutrient requirements of rice; Maintaining water supplies for rice; Social and economic factors and the sustainability of rice farming; Concerns about the sustainability of rice farming; Increasing and sustaining rice production.

Put Theory into Practice Scarcity of natural resources, higher costs, higher demand, and concerns about environmental pollution- under these circumstances, improving food supply worldwide with adequate quantity and quality is fundamental. Based on the author’s more than forty years of experience, The Use of Nutrients in Crop Plants

Introduction and background; Characterization of environments; Nutrient balances; Managing organic matter; Nutrient x water interactions; Soil physical constraints and nutrient availability; Germplasm for nutrient efficiency.

This fourth edition of the Rice Almanac continues the tradition of the first three editions by showcasing rice as the most important staple food in the world and all that is involved in maintaining rice production. It also breaks new ground in its coverage of issues related to rice production, both environmental--including climate change--and its importance for food security and the global economy. It also further expands coverage of the world’s rice production area by featuring 80 rice-producing countries around the world.
These proceedings report the outcome of an international workshop held in Vientiane, Laos, between 30th October and 2nd November 2000 to coincide with the beginning of a new ACIAR project, Increased productivity of rice-based cropping systems in Lao PDR, Cambodia and Australia.

Overview of rainfed rice issues; Sustainability issues in rainfed rice farming; Rainfed rice ecosystems; Rainfed rice farming systems; Crop establishment in rainfed environments; Rainfed rice varietal development and improvement: breeding strategies, methods and outputs; Rice seed management; Soil and nutrient management; Rainfall, on-farm water and soil moisture management; Weed management; Pest, disease and rat management; Participatory farming systems technology development.

An investigation has been undertaken to determine the consequence of using water table control for lowland rice production by growing rice varieties Azucena and IR36 in sand cores under a controlled environment in a series of experiments in which the water table was held at fixed levels. Each experiment had a duration of six weeks and in all, four treatments were used: (a) water table at a depth of 30 cm below the surface, (b) water table at a depth of 15 cm below the surface, (c) saturated sand and (c) flooded sand.