

Preface

Environmental Change and Rice Production in Monsoon Asia

Global climatic change caused by anthropogenic GHGs will no doubt affect food productivity directly and cause food shortages indirectly as the global population increases. These effects can be confirmed by noting global total/average figures. The complexity of the effects of the global climate, however, are not yet clearly known or understood and will vary for region to region or nation to nation.

Food security will be one of the most serious problems of the 21st century, but it can be approached in various ways. In one sense, it is an abstract concept ; but when it is considered a form of insurance for the survival of a nation, it becomes more concrete. Furthermore, food security is commonly discussed in terms of one country (nation), although food markets today are global in scale.

The Monsoon Asia region can be considered as one unit from the standpoint of not only the climatic environment, but also human societies, which have been developing culturally, historically, economically, etc., over long periods of time, and which can be divided geographically into southern, southeastern and eastern Asian. European and American scientists have done many studies on land-people linkages in Monsoon Asia, particularly since the 1930s. For example, P.Gourou, Karl J.Pelzer, George B.Cressey, E.H.G. Dobby, L.D. Stamp, C.A. Fisher, H.Robinson and D.W. Fryer have contributed studies in their respective decades. In recent years, these have evolved into detailed, individual fields of study, and not into integrated, multidisciplinary studies.

The early studies concluded that the high density of the population in Monsoon Asia could be supported only by agricultural societies based on rice production. This conclusion has been generally accepted and still shows up in textbooks today. But is this conclusion applicable to the 21st century? More work is needed before we can answer that question.

An international project was proposed at the "Human Dimensions Workshop" in New Delhi on 20-23 January 1997 and also at the "START-WCRP-IGBP/GCTE Workshop on Climate Variability, Agricultural Productivity and Food Security in the Asian Monsoon Region" at Bogor on 19-22 February 1997. The proposed project's keywords were to be "Monsoon Asia", "rice-producing societies", and "population", in consideration of the summaries, conclusions and recommendations of previous studies, meetings, workshops and symposiums and the most recent World Food Summit. In order to begin discussing details, the "APN International Working Group Meeting for planning a project on environmental change and rice-producing societies in Monsoon Asia" was held in Tsukuba on 29 August 1997 and again in Kyoto on 12 October 1998.

In addition to these activities, there was also an international meeting held on this subject, taking the opportunity of the 2nd IGBP Congress at Shonan Village, Kanagawa Prefecture, Japan, in May 1999. This special issue of *Global Environmental Research* includes papers presented at a session of the IGBP Congress on the afternoon of May 12, under the sponsorship of the APN.

As has been described in Koyama's paper, the high density of Asia's population has supported intensive Asian agriculture for a long time. Rapid economic increases, however, are forcing Asian agriculture to face a turning point toward a more diversified process from traditional paddy-field-based agriculture. In addition, the high dependence on chemical inputs and irrigation water has begun to limit future productivity gains and can sometimes threaten human security. The present special issue aims, firstly, to deal with changes in rice

production in relation to population, industrialization/urbanization, doubling CO₂ concentration and unusual or extreme climate/weather anomalies under the global warming. Approaches by comparative, descriptive and field studies, as well as modeling and experimental studies, have been and still are being carried out in Monsoon Asia as a whole or in the respective countries of Asia. The results obtained so far will be checked further, because the studies contained in this volume are either just beginning or will be continuing. Examples from India, Sri Lanka, Thailand and Indonesia are given here representing South and Southeast Asia, and from China, South Korea and Japan, representing East Asia.

Since Asia includes two countries with enormous populations and hence food security problems, India and China, consideration should be given to trade, stockpiling and so on. In order to maintain the production potential within this region, sustainable management of agriculture is also indispensable.

We hope that this special issue will contribute to promotion of further studies and motivate policy makers to some extent to deal with these problems at the present stage.

Last, but not least, the editor would like to express sincere thanks to the APN for supporting the travel costs of participants from developing countries to the IGBP Congress session in May 12, 1999. This special issue includes the first-step results of group studies, which are one part of the sub-theme of studies on "Environmental Changes and Food Security in Asia" (leader: Osamu Koyama) under the main theme of "Assessment Methods in Development and Application of Environmental Security in Asia" (chief-leader: Hideo Harasawa), which has been supported by the Japan Environment Agency for FY 1999-2000.

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