

Global Data Utilization for Climatic Changes and Evaluation of Their Effects on Agriculture in Asian Monsoon Region

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1. Introduction

It is important to predict climate change correctly in regional scale and to build adaptation measures and mitigation measures in the Asian monsoon region where more than 60 % of the world's population are living. The reliability of climate change prediction model is evaluated by the reproducibility of past climate in general. However, because there are many developing countries in the Asian monsoon region, adequate documentations of past climate which are needed to evaluate the climate reproducibility have not been prepared. In addition, at present it is difficult to get information on wide-area agricultural meteorological data which affect the growth of agricultural crops when considering the impact on agriculture of climate. This study has been proposed to increase the confidence in future climate prediction of Asian monsoon and to build an information infrastructure in order to develop mitigation measures and adaptation of agriculture to expected climate change.

2. Configuration and goal of the study

In this study, five research institutions which are responsible for climate change and agricultural impact researches, work closely for four sub-themes. (Figure 1)

FIGURE 1: An overview of this study (2011-2015)

2.1. Development of Agro-climatological Data-base in the Developing Countries

In developing countries of the Asian monsoon region, the publication of meteorological data is not sufficient. In addition, it is difficult to use wide-area data with the exception of some low-precision global data because the data is managed separately in each country. In this sub-theme, we will make a database of the paper-based data which were observed from the northeastern part of China to Southeast Asian countries in the Asian monsoon region.

2.2. Impact of Land-Use/Land-Cover (LULC) Changes on the Asian Monsoon Climate

In the Asian monsoon region, there is the Asia-specific surface state such as paddy. The land surface state is affected by climate change and controlled artificially at the same time. By comparing the output of multiple climate models that are generated on the DIAS and using the data of more ground surface, we will make clear the importance of land surface atmosphere interaction including the effects of anthropogenic Asian monsoon.

2.3. Climatic Changes and Evaluation of Their Effects on Agriculture Based on a Field Survey

We will build a simulation system that can grow in various conditions different cultivar, weather, and cultivation management. The system will have the flexibility that can replace the crops and crop model depending on the type and observation interval of observation data available. By giving the effects of climate change in this system, we will assess the impact of climate change to target crops. The researchers and agricultural extension will be able to browse the simulation results from anywhere using the Web application.

2.4. Development of Information Platform to Design Adaptation and Mitigation Strategies of Major Crops against the Predicted Climatic Changes

Rice is a main crop in the Asian monsoon region where is a zone of greenhouse gases such as methane in the agricultural sector. In order to construct future sustainable food production systems in the Asian monsoon region, it is necessary to consider the trade-off initiatives of mitigation and adaptation technology to global warming. In this sub-theme, we will implement the development of information infrastructure and integration related to agriculture meteorology, soil, land use, land management.

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References

Climatic Changes and Evaluation of Their Effects on Agriculture in Asian Monsoon Region, <http://grene.agrid.org/htdocs/>

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Climatic changes and evaluation of their effects on agriculture in Asian monsoon region (CAAM)

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Climatic Changes and Evaluation of Their Effects on Agriculture in Asian Monsoon Region



Aims
 1. To improve the reliability of future climate prediction, 2. To develop the information platform which will be useful to design adaptation and mitigation strategies in agriculture against the predicted climatic changes in Asian monsoon region

Climate change research	Agricultural effect research
<p>Development of Agro-climatological Data-base in the Developing Countries JAMSTEC</p> <ul style="list-style-type: none"> Digitization of old observational data recorded in paper format Estimation of the element of Agricultural Meteorology Agro-meteorological data base Near real-time meteorological data acquisition system heat balance model 	<p>Climatic Changes and Evaluation of Their Effects on Agriculture Based on a Field Survey 気象庁 農研機構</p> <ul style="list-style-type: none"> Assessment System Using Meteorological Data and Crop Models Validation of evaluation system by field survey Construction of the system for crop simulation under various conditions Survey of cropping Comparison of simulation and real planting Evaluation of the impact of climate change on crop production Cultivation based on the simulation test
<p>Impact of Land-Use/Land-Cover (LULC) Changes on the Asian Monsoon Climate - Land-Atmosphere Interaction Study - 京都大学 東京大学</p> <ul style="list-style-type: none"> Use of climate-model output on the DIAS and a detailed land surface data Elucidation of the importance of land surface-atmosphere interaction including the impact of anthropogenic Asian monsoon region 	<p>Development of Information Platform to Design Adaptation and Mitigation Strategies of Major Crops against the Predicted Climatic Changes AMES 農研機構 環境省</p> <ul style="list-style-type: none"> Collection and maintenance of information related to land use and land management, soil and Agricultural Meteorology Collection of basic data on greenhouse gas balance in agricultural land

DIAS
 /Collection and maintenance of information related to land use and land management, soil and Agricultural Meteorology
 /Collection of basic data on greenhouse gas balance in agricultural land

Results

1. Development of basic environmental information and its application to decision-making in the Asian monsoon region
2. Training of young researchers to lead the study of global warming mitigation measures and adaptation research and climate change
3. Construction of information infrastructure for the realization of global warming, adaptation and mitigation measures for agricultural sectors