Haruo Sawada Sophal Chann Akira Shimizu Makoto Araki (Eds.)

Proceedings of
International Workshop on
Forest Watershed 2004

Phnom Penh, Cambodia 29 Oct. 2004 DR. HARUO SAWADA CWCM Project Coordinator Principal Research Coordinator Forestry and Forest Products Research Institute (FFPRI) Matsunosato 1, Tsukuba, Ibaraki, 305-8687 Japan

MR. SOPHAL CHANN
CWCM Project Coordinator
Forest and Wildlife Science Research Institute
Forestry Administration
40 Preah Norodom Blvd., Phnom Penh, Cambodia

DR. AKIRA SHIMIZU
Chief, Forest Hydrology Laboratory
Forestry and Forest Products Research Institute (FFPRI)
Matsunosato 1, Tsukuba, Ibaraki, 305-8687 Japan

DR. MAKOTO ARAKI Chief, Soil Resources Evaluation Forestry and Forest Products Research Institute (FFPRI) Matsunosato 1, Tsukuba, Ibaraki, 305-8687 Japan

ISBN 4-902606-03-8

Forestry and Forest Products Research Institute Matsunosato 1, Tsukuba, Ibaraki, 305-8687 Japan

Proceedings of International Workshop of Forest Watershed 2004

Printed in Japan

Preface



Water management for international rivers that run through many countries has sometimes brought about international problems. Therefore, reliable information is quite important for mutual understanding in related countries. The Mekong River is one of such international rivers and it flows down from China to Laos, Myanmar, Thailand, Cambodia and Vietnam. Millions of people live in the Mekong River Basin and the influences of water management, such as dam constructions, are becoming quite serious in this region. However, the environmental information along the River Basin is not well exchanged among the countries because of several reasons; lack of information is one of them.

In Cambodia, there is very little information about its forest because of their unfortunate history, although the knowledge about forest characteristics, especially on their hydrological functions, is quite important for watershed management,.

We, as researchers having experiences on watershed management in Japan, started two research projects related to the Mekong River Basin. The one is the five year project on "Development of Simulation Models for Hydrology and Water Resources in the Mekong River Basin" financed by the RR2002 of Ministry of Education, Culture Sports, Science and Technology (MEXT) started in 2002 and the other is the five year project on "Assessment of Water Circulation Dynamics in the Mekong River Basin" of the Ministry of Agriculture, Forestry and Fisheries in 2003.

Under these circumstances, Forestry and Forest Products Research Institute (FFPRI, Japan) and Forestry Administration (previously Department of Forestry and Wildlife, under Ministry of Agriculture, Forestry, and Fisheries, Cambodia) started the joint research project "Changes of Water Circulation in the Mekong River Basin (CWCM)" in 2002. Japanese researchers in FFPRI, Kyoto University, Nagoya University, Tokyo University as well as Tsukuba University are involved and they have conducted field studies in the Mekong River Basin. The permanent study fields have been set up and the soils, ground water level, stem flow, rainfall and other related data have been continuously measured in Cambodia since 2002. The weather observation tower 60 meters high was constructed in October 2003 in evergreen forest area in Kompong Thom Province and it is collecting three dimensional forest environment data along the tower.

The Cambodian researches are invited to Japan every year as the counterparts for the project and have chances to visit research fields as well as related institutions. These activities have already brought out many results for this region.

It was our great pleasure and honor to have the Workshop on "Forest Watershed 2004" based on the joint project between Cambodia and Japan. Although the Workshop was

held on the same day of the coronation of the King Norodom Sihamoni, there were more than 60 participants from the Forest and Wildlife Science Research Institute (FWSRI), Universities and other institutions in Cambodia. It was a testimony of their concerns on this project.

We would like to give our special thanks to the JICA project "Project-type Technical Cooperation for Capacity Building for the Forestry Sector" who allowed us to use their training room and equipments in the Training Center for Forestry and Wildlife for this workshop. We should also remember the day as our memorial day for celebrating our new relationships with other sectors. We do hope that the relationship between Cambodia and Japan makes great progress in this field.

Haruo Sawada

Japanese Leader for the CWCM project

Principal Research Coordinator Forestry and Forest Products Research Institute

CONTENTS

Preface

Historical Mapping of Water Content of Natural Vegetation	
Historical Mapping of Water Content of Natural Vegetation	
Haruo Sawada, Hideki Saito, Naoyuki Furuya, Meas Makara, Khou Sok Heng,	
Pak Chearly	1
Dataset for seasonal change analysis for the Mekong River Basin	
Haruo Sawada, Yoshito Sawada, Meas Makara, Khou Sok Heng, Pak Chearly	4
Estimation of Ground Rainfall and Development of soil Water Supply Model	
Estimation of Ground Rainfall and Development of soil Water Supply Model	
Makoto Araki, Eriko Ito, Seiichi Ohta, Mamoru Kanzaki, Pol Sopheavuth, Tith Bora,	
Lim Sopheap	11
Forests and its vegetation in Kompong Thom, Cambodia	
Mamoru Kanzaki, Seiichi Ohta, Takayuki Kaneko, Jumpei Toriyama, Reiko Hiramats	su,
Youichirou Okuda, Makoto Araki, Eriko Ito, Pol Sopheavuth, Tith Bora, Lim Sophea	ιp,
Khorn Saret, Pith Phearak, Det Saila	15
Forest soil and its proterties in Kompong Thom, Cambodia	
Seiichi Ohta, Jumpei Toriyama, Mamoru Kanzaki, Makoto Araki, Eriko Ito, Pol Sopheavut	th,
Tith Bora, Lim Sopheap, Khorn Saret, Pith Phearak, Det Saila	20
Forest soil moisture conditions in Kompong Thom, Cambodia	-
Makoto Araki, Eriko Ito, Seiichi Ohta, Jumpei Toriyama, Mamoru Kanzaki, Takayuki Kanek	ю,
Pol Sopheavuth, Tith Bora, Lim Sopheap, Khorn Sret, Pith Phearak, Det Saila	24
Leaf area index in tropical seasonal forests in Kompong Thom, Cambodia	
Eriko Ito, Makoto Araki, Mamoru Kanzaki, Seiichi Ohta, Takayuki Kaneko, Akihiro Tar	ıi,
Reiko Hiramatsu, Jumpei Toriyama, Youichirou Okuda, Pol Sopheavuth, Tith Bora,	
Lim Sopheap, Khorn Saret, Pith Phearak, Det Saila	28
Development of Prediction Models on Variation of Storage of Water Resources	
Development of Prediction Models on Variation of Storage of Water Resources	
Yasuhiro Ohnuki, Yoshiki Shinomiya, Kimhern Chansopheaktra, Sor Sethik3	33
Distribution of soil depth at forested areas in three provinces in Cambodia	
Yasuhiro Ohnuki, Yoshiki Shinomiya, Kimhern Chansopheaktra, Sor Sethik3	37
Distribution of soil water permeability at forested areas in three provinces in Cambodia	
Yoshiki Shinomiya Yasuhiro Ohnuki Kimhern Chansonheaktra Sor Sathik	12

Clarification of Forest Management Influence in Water Transfer Process among
Soil-Plant-Atmosphere Continuum
Clarification of Forest Management Influence in Water Transfer Process among
Soil-Plant-Atmosphere Continuum
Akira Shimizu, Tatsuhiko Nobuhiro, Koji Tamai, Shigeaki Hattori, Sophal Chann47
Set up of evapotranspiration observation system in an evergreen broad-leaf forest watershed
Sophal Chann, Nara Tith, Akira Shimizu, Naoki Kabeya, Tatsuhiko Nobuhiro, Koji Tamai,
Yoshio Tsuboyama, Tayoko Kubota51
Meterological factors observation in an evergreen broad-leaf forest watershed
Akira Shimizu, Tatsuhiko Nobuhiro, Naoki Kabeya, Tayoko Kubota, Koji Tamai,
Sophal Chann, Nara Tith55
Differences in evapotranspiration between late rainy season and middle dry season in an evergreen
broad-leaf forest
Tatsuhiko Nobuhiro, Akira Shimizu, Naoki Kabeya, Tayoko Kubota, Yoshio Tsuboyama,
Koi Tamai, Sophal Chann, Nara Tith61
Characteristics of transpiration in leaf-scale and forest floor evaporation in dry evergreen and dry
deciduous forests in O Thom I watershed
Shigeaki Hattori, Aiko Deguchi, Kenichi Daikoku
Influence to Spatial and Temporal Variation of Water Flow in Forested
Catchments
Influence to Spatial and Temporal Variation of Water Flow in Forested Catchments
Akira Shimizu, Naoki Kabeya, Tayoko Kubota, Yoshio Tsuboyama, Nara Tith73
Precipitation and stream flow measurement in Cambodia forested watershed
Nara Tith, Sophal Chann, Akira Shimizu, Naoki Kabeya, Tatsuhiko Nobuhiro, Tayoko Kubota
Yoshio Tsuboyama, Koji Tamai77
Wind Observations in the evergreen forest in Central Cambodia
Koji Tamai, Akira Shimizu, Tatsuhiko Nobuhiro, Naoki Kabeya, Sophal Chann, Nara Tith82
Stable oxygen isotope analysis around the confluence of the Tonle Sap and the Mekong
Naoki Kabaya, Tayoko Kubota, Akira Shimizu, Tatsuhiko Nobuhiro, Yoshio Tsuboyama
Sophal Chann, Nara Tith8
The estimation of the topographic index used in topmodel
Tayoko Kubota, Yoshio Tsuboyama9