

Proceedings of
10th International Workshop on
Forest Watershed Environment Research in Cambodia,
24, September 2014
Phnom Penh, Cambodia

Akira Shimizu, Sophal Chann, Haruo Sawada,
Yasuhiro Ohnuki, Koji Tamai (Eds.)

Forestry and Forest Products Research Institute, Japan

Forestry Administration, Cambodia

Scientific Committee

DR. AKIRA SHIMIZU

CWCM Project Coordinator

Industry-University-Government Coordinator

Kyushu Research Center

Forestry & Forest Products Research Institute (FFPRI)

4-11-16 Kurokami, Kumamoto, Kumamoto, 860-0862 JAPAN

MR. SOPHAL CHANN

CWCM Project Coordinator

Forest and Wildlife Research and Development Institute (IRD)

Hanoi Street, Phoum Rongchak, Sankat Phnom Penh Thmei,

Klan Sen Sok, Phnom Penh, Cambodia

DR. HARUO SAWADA

Visiting Professor, Geoinformatics Center (GIC), Asian Institute of Technology (AIT)

58 Moo 9, Paholyothin Highway Klong Luang, Pathumthani 12120 Thailand

Emeritus Professor, Institute of Industrial Science, The University of Tokyo

4-6-1 Komaba, Meguro, Tokyo, 153-8505 JAPAN

DR. YASUHIRO OHNUKI

Chief of Soil Geochemistry Laboratory

Forestry & Forest Products Research Institute (FFPRI)

Matsunosato 1, Tsukuba, Ibaraki, 305-8687 JAPAN

DR. KOJI TAMAI

Chief of Forest Hydrology Laboratory

Forestry & Forest Products Research Institute (FFPRI)

Matsunosato 1, Tsukuba, Ibaraki, 305-8687 JAPAN

ISBN: 978-4-905304-49-4

Forestry & Forest Products Research Institute

Matsunosato 1, Tsukuba, Ibaraki, 305-8687 JAPAN

Forestry Administration

40 Preah Norodom Blvd., Phnom Penh, Cambodia

Proceedings of 10th International Workshop on Forest Watershed Environment Research in Cambodia

Published and printed in Cambodia and Japan, February 2015.

Preface

The Workshop started in 2004 aiming to release the results of research to society widely from the beginning of the collaborative research project between Cambodia and Japan, and considering it as a part of solutions of all kinds of problems through the friendship with people of different fields. The tropical seasonal forests in flat lands are now very precious in the Indochinese Peninsula, because there are hardly remaining forests except for this region. Firstly, we have gained many kinds of information about vegetation composition, soil characteristic, water balance, evapotranspiration, forest climate, etc. in Cambodian evergreen forests. In addition, we have also studied the deciduous forest and compared the observed results at two forest watersheds in Cambodia for comprehensive understandings of energy, water, and carbon dioxide cycling in forests of Mekong River Basin.

This is the 10th workshop holdings once a year. In these more ten years research periods, the situation of surrounding forests in this region has been changing a lot, and we need to deal with various problems, such as natural disasters, the influence of global warming, maldistribution of water resources in connection with climate change, human impacts in forest utilization, etc. In particular, many meteorological disasters have occurred frequently over the past several years in the Asia monsoon zone. We had the severe flood disaster in the south part of Indochina Peninsula, especially in Thailand and Cambodia in 2011. The severe typhoon attacked Philippines in 2013. This year, flood disaster and induced large-scale landslide occurred in Afghanistan in April. And, in August, flood damage occurred in Bangladesh, Myanmar, and Nepal. Furthermore, in September, the large area from South Asia to China was hit by the heavy rain, severe and serious damage was caused by the large-scale flood in Pakistan or India and also China.

The global warming might be the important factor concerning to the flood, and the disorderly deforestation might be set to one of the causes of the flood. What is significant in these arguments is that we must interpret on the basis of the exact integrated continuous observation data using the stable experimental watershed. Since these extreme meteorological disasters have higher possibility of happens hereafter owing to influence of global warming, accumulation of high-precision hydro-meteorological observation data with forest information is indispensable. Accordingly, the significance of accumulated data over more than 10 years until now is increasing much more, and they are expected to be effectively utilized for flood disaster prediction and global warming adaptation in the future. Investigating the cause of the disaster by analyzing this kind of data contributes to suitable and sustainable forestry management and sustainable development greatly.

There would be no greater pleasure than if, better forest management or an improvement of a life environment were promoted by profound understanding about forest through this workshop. I deeply appreciate many efforts of Cambodian Forest Administration staff.

**SHIMIZU Akira: Conference Secretariat
Industry-University-Government Coordinator
in Kyushu Research Centre
Forestry and Forest Products Research Institute, Japan**

CONTENTS

Preface

SHIMIZU Akira

Forest Hydrology

H-01

Preliminary estimation of interception loss in an evergreen forest located in Kampong Thom Province, Cambodia

IIDA Shin'ichi, SHIMIZU Takanori, TAMAI Koji, KABEYA Naoki, SHIMIZU Akira, CHANN Sophal, SATHA Saing, PHALLAPHEARAOTH Op

H-02

Water budgets in a deciduous broad-leaved forested watershed of Cambodia in 2010 to 2013

SATHA Saing, KABEYA Naoki, CHANN Sophal, SHIMIZU Akira, IIDA Shin'ichi, OHNUKI Yasuhiro, SHIMIZU Takanori, TAMAI Koji, PHALLAPHEARAOTH Op

H-03

Characteristics of soil moisture-respiration relation in dry evergreen and deciduous forests in Cambodia

TAMAI Koji, TORIYAMA Jumpei, OHNUKI Yasuhiro, SHIMIZU Akira, SHIMIZU Takanori, IIDA Shin'ichi, KABEYA Naoki, CHANN Sophal, PHALLAPHEARAOTH Op, SATHA Saing

H-04

Inter-annual variation of water vapor exchange measured by the bandpass eddy covariance method over a dry evergreen forest in the central Cambodia

SHIMIZU Takanori, SHIMIZU Akira, IIDA Shin'ichi, KABEYA Naoki, CHANN Sophal, TAMAI Koji

H-05

The effect of partial harvesting on streamflow in an evergreen broadleaved watershed

KABEYA Naoki, CHAPPELL Nick A., TYCH Wlodek, SHIMIZU Akira

H-06

Prediction of increase in surface temperature due to declines of overstory trees in a deciduous forest, central Cambodia

CHANN Sophal, SATHA Saing, PHALLAPHEARAOTH Op, IIDA Shin'ichi, SHIMIZU Takanori, ITO Eriko, SHIMIZU Akira, KABEYA Naoki, TAMAI Koji, OHNUKI Yasuhiro

Forest Ecology

E-01

Net Primary Production (NPP) estimation in Cambodia: comparison between the Kampong Thom and Kratie meteorological observation tower plots

TITH Bora, ITO Eriko, FURUYA Naoyuki, KURAMOTO Shigeo, OHNUKI Yasuhiro, TORIYAMA Jumpei, MONDA Yukako, ARAKI Makoto, SHIBATA Mitsue, YAGI Takanobu, SAKAI Yoshimi, KANZAKI Mamoru, KETH Samkol, CHANDARARITY Ly, PHALLAPHEARAOTH Op, POL Sopheavuth, LIM Sopheap, PITH Phearak, KHOM Saret, CHANN Sophal

E-02

Impact of selective logging on stand carbon storage in *Dipterocarpus obtusifolius* stand

ITO Eriko, FURUYA Naoyuki, MONDA Yukako, TORIYAMA Jumpei, OHNUKI Yasuhiro, KIYONO Yoshiyuki, ARAKI Makoto, TITH Bora, KETH Samkol, CHANDARARITY Ly, PHALLAPHEARAOTH Op, CHANN Sophal, KANZAKI Mamoru

E-03

Spatial variation of soil water content, soil hardness and ground temperature at deciduous and evergreen forests in Cambodia –Continued Report–

OHNUKI Yasuhiro, KETH Samkol, ITO Eriko, TITH Bora, CHANN Sophal, KABEYA Naoki, TORIYAMA Jumpei, ARAKI Makoto

E-04

Seasonal changes of photosynthetic properties on dry deciduous forest trees in Cambodia

KENZO Tanaka, IIDA Shin'ichi, SHIMIZU Takanori, TAMAI Koji, KABEYA Naoki, SHIMIZU Akira, CHANN Sophal

Forest Management

M-01

The improvement of the estimation of deforestation area and land use of the deforestation area in Cambodia,

NAKAZONO Etsuko, SAWADA Haruo

M-02

Model estimation for rate of fire spread and flame height in forest fire - In case of dry deciduous forest in Kratie, Cambodia –

TAMAI Koji, GOTO Yoshiaki, SHIMIZU Akira, SHIMIZU Takanori, KABEYA Naoki, IIDA Shin'ichi, CHANN Sophal, SATHA Saing, Op Phallaphearaoth

M-03

Change and Structure in Household Income of central Cambodian Frontier Villages: Implications for Effective Livelihood Support under New Forest Management Regime

KURASHIMA Takayuki, MATSUURA Toshiya, MIYAMOTO Asako, SANO Makoto, TITH Bora, CHANN Sophal