# 2010 Project Bulletin

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APN Secretariat
East Building 4F
1-5-2 Wakinohama Kaigan Dori
Chuo-ku, Kobe 651-0073
JAPAN
Tel: (+81) 078-230-8017
Fax: (+81) 078-230-8018
Email: info@apn-gcr.org
Website: http://www.apn-gcr.org

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# PREFACE

The Asia-Pacific Network for Global Change Research is an international network of member governments whose mission is to enable investigation of change in the Earth's life support systems as it occurs in the Asia-Pacific region to:

1. Identify, explain and predict changes in the context of both natural and anthropogenic forcing;
2. Assess potential regional and global vulnerability of natural and human systems; and
3. Contribute, from the science perspective, to the development of policy options for appropriate responses to global change that will also contribute to sustainable development.

Changes in the Earth system are clearly impacting the societies and economies of the countries within the Asia-Pacific region. These countries support more than half of the world's population. Recent research and supporting observations have provided new insights into some of these changes and their impacts but have, at the same time, opened a number of new and challenging scientific issues. The APN seeks to identify such emerging issues and to promote and encourage regional cooperative research to address these. In doing so, the APN assures that the results of this research contribute to the development of a sound scientific base for decision- and policy-making related to issues for which global change is an important factor.

*As part of its dissemination activities, the present publication outlines abstracts of currently-funded activities in the APN under its Annual Regional Call for Research Proposals (ARCP) and its Capacity Development Programme, CAPaBLE.*

The APN supports and encourages the dissemination of the information contained in this publication and specifically notes that the potential results of the present research and capacity development activities can facilitate policy development relating to Global Change in the Asia-Pacific Region.

*This publication is also available on the APN website*
*www.apn-gcr.org*

Secretariat
Asia-Pacific Network for Global Change Research (APN)

ARCP

# Section One

## Projects funded under the Annual Regional Call for Research Proposals (ARCP)

# 1.1 ARCP2009-01CMY-Fukami

## Flood Risk Management Demonstration Project under the Asian Water Cycle Initiative for the Global Earth Observation System of Systems (FRM/AWCI/GEOSS)

**Project Leader:** Mr. Kazuhiko Fukami
International Centre for Water Hazard and Risk Management (ICHARM)
Public Works Research Institute (PWRI)
JAPAN
Tel: +81 29-879-6778
Fax: +81 29-879-6709
Email: k-fukami@pwri.go.jp

**APN Funding:** US$84,000 (For 2 Years)

**Project Summary:**
This project, currently in its second year, aims to enhance and utilise regional cooperation to achieve the following three targets with the use of the resources and knowledge available at various specialised institutions in the Asia-Pacific Region under the framework of the AWCI contributing to GEOSS: 1) to convert observations and data, both through space borne platforms and data integration initiatives, to provide usable information for flood reduction; 2) to improve quantitative forecasts for coupled precipitation - flood-forecasting systems; and 3) to facilitate flood risk assessment through the provision of scenarios and data for exposure estimation.

Since the project started, the flood-working group (FWG) discussions have been held in Beijing, Kyoto and Tokyo, as part of the International Coordination Group (ICG) Meetings for GEOSS-AWCI in cooperation with two CAPaBLE projects (CBA2009-01CMY-Ailikun and CBA2009-02CMY-Ishida). Through FWG discussions, fundamental knowledge and information for enhancing demonstration projects in each member country were exchanged and shared, and the necessity of capacity

development was raised. Several priority areas were identified for capacity building, and as an example of building capacities and promoting research activities, three international workshops were held (a research session at the fourth Asia-Pacific Association of Hydrology and Water Resources [APHW] in Beijing and two workshops on the Application and Validation of Global Flood Alert Systems [GFAS] in Tsukuba).

**Project Website:** http://monsoon.t.u-tokyo.ac.jp/AWCI/

**Publications:**


- Shiraishi et al. 2009. A proposal of correction method using the movement of rainfall area on satellite-based rainfall information by analysis in the Yoshino River Basin, Annual Journal of Hydraulic Engineering, JSCE, vol. 53, pp. 385-390 (in Japanese).
- Sugiura et al. 2009. Development of Integrated Flood Analysis System (IFAS) and its Applications, Proceedings of the 8th International Conference on Hydroinfomatics, 12-16 January 2009, Concepción, Chile.

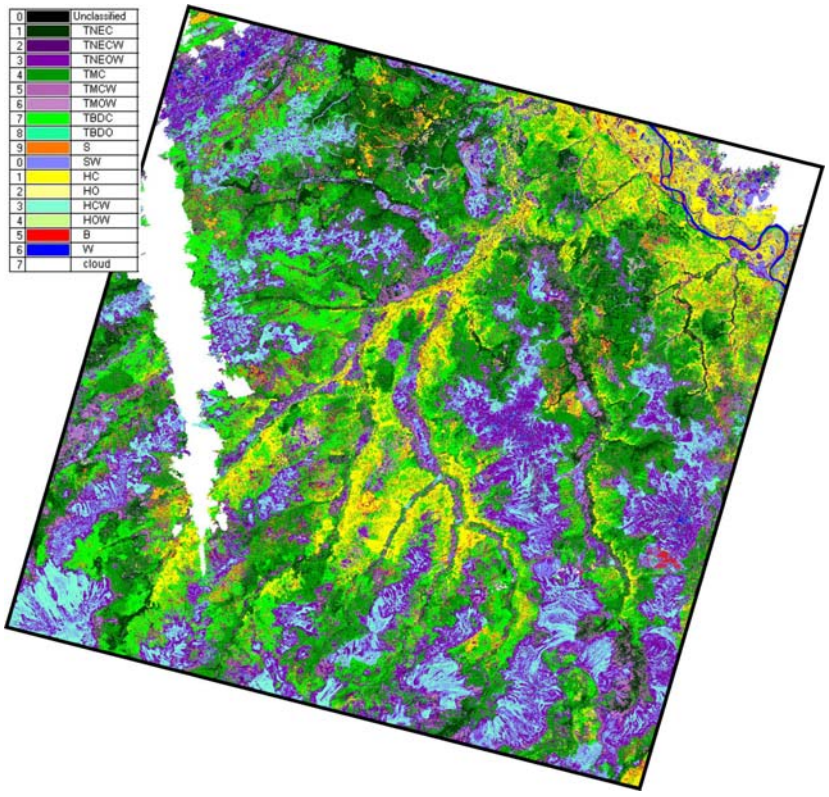
# 1.2 ARCP2009-02CMY-Okladnikov

## Human Impact on Land-Cover Changes in the Heart of Asia

**Project Leader:** Dr. Igor Okladnikov
Siberian Centre for Environmental Research and Training (SCERT)/Institute for Monitoring of Climatic and Ecological Systems (Siberian Branch of RAS), Tomsk
RUSSIAN FEDERATION
Tel: +7 3822 492187
Fax: +7 3822 492537
Email: oig@scert.ru

**APN Funding:** US$58,000 (For 2 Years)

**Project Summary:**
Understanding the human impacts on land-cover and the capacity to monitor change over time is fundamental to sound scientific research and informed decision-making to address Global Change and ensure sustainable development. While remote sensing technology is evolving rapidly and multiple land-cover products have been developed, the lack of reliable information on land-cover remains a major obstacle for developing sound land-use policies. There is



significant disagreement among the available land-cover products, particularly in the proposed study region in the heart of Asia where validation sites are sparse, the impact of climate change is severe, and processes of land-cover change are widespread and strongly influenced by humans.

There is significant concentration of disagreement in the distribution of tree cover immediately north of Tomsk, Russia and a major area of confusion between herbaceous cover and bare land south of Ulaanbaatar, Mongolia. Analysis of the actual land-cover in these locations will help resolve the differences and evaluate available land-cover products. The analysis of results and synthesis across the study region is focussing on understanding the human impacts on land-cover, an assessment of the responses of land cover to changes in climate and land-use, the evaluation of available coarse-resolution land-cover products, and the development of a summary of findings for regional decision-makers.

The project is developing tools, methods, data, and the collaboration needed to characterise future land-cover dynamics in the region in order to contribute to broader regional and global efforts to study land-cover and its change. After completion of the project, data will be made available on the SCERT and Northern Eurasian Earth Science Partnership Initiative (NEESPI) websites. The project will also contribute to the ongoing effort of the Global Observation of Forest and Land Cover Dynamics (GPFC-GOLD) and the Global Change SysTem for Analysis, Research and Training (START) International to develop a regional network of collaborators involved in observations of land-cover and its change.

**Publications:**


- Nelson, P. Krankina, O., Kennedy, R. and Cohen, W.2009. Analyzing the 1972-2008 *Landsat Satellite Imagery Archive to Detect Land Cover and Land Use Change in Mongolia*. Proceedings of The 3rd International and National Workshop "Applications of Geoinformatics for Mongolian Natural Resource and Environment," Ulaanbaatar, Mongolia, 30 June – 2 July, 2009, p. 48.
- Okladnikov I.G., Krankina O.N., Tsolmon R., Gordov E.P. 2009. *Anthropogenic Impact on Land-cover Changes in the Heart of Asia.* Proceedings of International Conference and Young Scientists School CITES-2009, Krasnoyarsk, Russia, July 5-15, 2009, p. 82.

# 1.3 ARCP2009-03CMY-Nikitina

## Reducing Water Insecurity through Stakeholder Participation in River Basin Management in the Asia-Pacific

**Project Leader:** Dr. Elena Nikitina
EcoPolicy Research and Consulting, Independent Non-commercial Organisation
RUSSIAN FEDERATION
Tel: +7 985-773-3687
Fax: +7 985-773-3687
Email: elenanikitina@bk.ru

**APN Funding:** US$95,000 (For 2 Years)

**Project Summary:**
Pervasive and rapid land-use and water-use changes are being compounded by changes in global and regional climates to fundamentally alter the dimensions of water insecurity in river basins across the Asia-Pacific. This project is a *comparative* and *synthetic* study with new data gathering and analysis of water-related risks and actions by multiple stakeholders to reduce them. It deals with responses to risks that are associated with changes in both water quantity and quality: floods, water shortages, disruption in food production systems and in access to water of a good quality, and the growing vulnerability of urbanised areas.

Combination of policies and measures, including science and engineering, institutional, financial, and socio-economics that allows us to better deal with water-related insecurities is a priority in river basin management. Success of the latter depends on mitigation and adaptation efforts not only by the governments of the Asia-Pacific countries, but also by each stakeholder group within a basin having an interest, or the capacity to act. The focus of the project is on the *roles, opportunities* and *limitations* of major *stakeholder groups* in river basin water management in

five (5) countries of the Asia-Pacific – the Red and Mekong in Viet Nam, the Amur in Russia, the Salween in China, the Ping-Chao Phraya in Thailand, and the Latrobe in Australia.

Coordination between stakeholders and their partnerships is regarded as a powerful tool in good water governance. It is also a precondition for effective policy processes, capacity building towards basin sustainable development, and transfer of 'good practices' across river basins. Preliminary findings show that stakeholder involvement is also important for transborder river basin management. It appears to depend on a complex combination of domestic government policies, sound multilateral and basin-specific agreements, and on broader cooperation and dialogue involving multiple stakeholders.

Currently, based on case studies results, the project focusses on cross-basin comparative analysis, aggregation and generalisations on the roles and 'good practices' by major stakeholder groups in water basin management. Context specific problems, opportunities and constraints for stakeholder participation and partnerships are contrasted to worldwide findings.

**Publications:**


- Kotov, V. 2009. Changes in water management and the water law, In: Dellapenna J and Gupta J (eds) *The Evolution of the Law and Politics of Water*, Springer Science – Business Media BV.
- Lebel, L., B. T. Sinh, E. Nikitina. 2009. Governing risks: climate change, water insecurities, and disaster management In: Ed. R Shaw, *Climate Change Adaptation and Disaster Risk Reduction,* Emerald Publishers *(pending).*
- Lebel, L., B. T. Sinh, P. Garden, S. Seng, L. A. Tuan, D. V. Truc. 2009. The promise of flood protection: Dykes and dams, drains and diversions. Pages 283-306 *in* F Molle, T Foran, J Kakonen, eds. Contested Waterscapes in the Mekong Region. Earthscan, London.
- Lebel, L., T. Foran, P. Garden, B. J. Manuta. 2009. Adaptation to climate change and social justice: challenges for flood and disaster management in Thailand. In: F Ludwig, P Kabat, H van Schaik, M van der Valk, eds. *Climate change adaptation in the water sector*. Earthscan, London.
- Nikitina, E., L. Lebel, V. Kotov, B. T. Sinh.2010. How stakeholder participation and partnerships could reduce water insecurities in shared river basins. UNESCO Technical Documents Series, Selected articles from IV International Symposium on Transboundary Water Management *(in press).*
- Nikitina, E., E. Ostrovskaya, M. Fomenko. 2009. Towards better water governance in river basins: Some lessons learned from the Volga. *Regional Environmental Change,* Springer, Vol. 9, No 2.
- Sinh, B. T., L. Lebel, N. T. Tung. 2009. Indigenous knowledge and decision making in Vietnam: Living with floods in An Giang Province, Mekong Delta, Vietnam. In: R Shaw, ed. *Indigenous knowledge and disaster risk reduction: from practice to policy*. NOVA.
- Xu, J., R. Grumbine, A. Shrestha, M. Eriksson, X. Yang, Y. Wang, A. Wilkes.2009. The melting Himalayas: Cascading effects of climate change on water resources, biodiversity, and human livelihoods in the Greater Himalayas. *Conservation Biology* 23:520-530.

# 1.4 ARCP2009-04CMY-Shrestha

## Impacts of Global Change on the Dynamics of Snow, Glaciers and Runoff over the Himalayan Mountains and their Consequences for Highland and Downstream Regions

**Project Leader:** Prof. Dr. Kedar Lal Shrestha
Institute for Development and Innovation
NEPAL
Tel: +97 71 553 3028/ 71 553 7059
Fax: +97 71 553 3028/ 71 553 7059
Email: klshrestha@wlink.com.np

**APN Funding:** US$80,000 (For 2 Years)

**Project Summary:**
The melt-water from the extensive snow cover and glaciers in the Himalayas drains and runs into the perennial Himalayan river systems, so critical for the billions of people inhabiting the mountain slopes and plains in the south. Increased deglaciation currently observed in the Himalayas due to climate change is leading to changes in the hydrology of the region that are likely to have, in the long run, a significant and broad impact on the livelihood of the people and economies of both the highland and downstream regions.

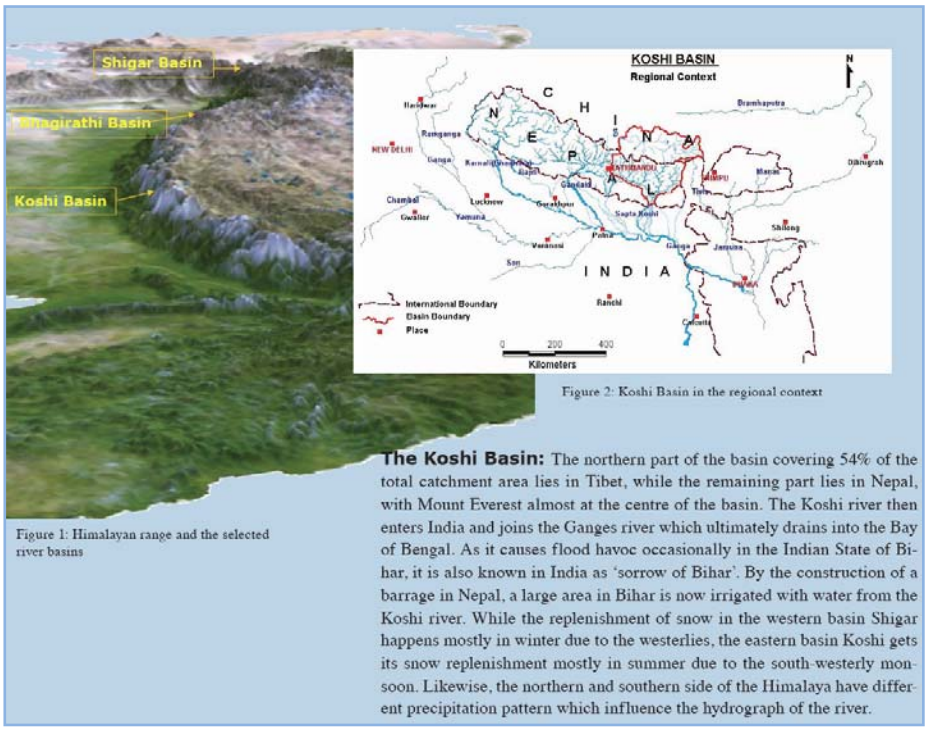



Figure 1: Himalayan range and the selected river basins

Figure 2: Koshi Basin in the regional context

**The Koshi Basin:** The northern part of the basin covering 54% of the total catchment area lies in Tibet, while the remaining part lies in Nepal, with Mount Everest almost at the centre of the basin. The Koshi river then enters India and joins the Ganges river which ultimately drains into the Bay of Bengal. As it causes flood havoc occasionally in the Indian State of Bihar, it is also known in India as 'sorrow of Bihar'. By the construction of a barrage in Nepal, a large area in Bihar is now irrigated with water from the Koshi river. While the replenishment of snow in the western basin Shigar happens mostly in winter due to the westerlies, the eastern basin Koshi gets its snow replenishment mostly in summer due to the south-westerly monsoon. Likewise, the northern and southern side of the Himalaya have different precipitation pattern which influence the hydrograph of the river.

In the course of the first year of this two-year project, three (3) representative river basins were selected along the Himalayan range namely the Hunza basin in Pakistan, the Upper Bhagirathi basin in India and the Koshi basin, of which the northern half lies in China and the southern half in Nepal, for studying such impacts. The research team in the collaborating institutions have acquired, pre-processed, and analysed necessary hydro-meteorological data for the selected river basins and have also assessed the altitudinal distribution of snow and glaciers over the selected basins by using suitable global datasets.

The project was launched to investigate freshwater-related issues in the Himalayas resulting from future global climate change. The project's objectives are to: 1) assess the impacts of climate change on the dynamics of snow, glaciers and runoff in the Himalayan mountains; 2) assess the consequences for people's livelihoods and the economies and societies in the upland and downstream regions; and 3) provide scientific information to planners and policy-makers for identifying and implementing adaptation and mitigation strategies for sustainable development of the regions.

**Publication:**


- Shrestha, K. L. 2009. Mountain Research Initiative Newsletter no. 3 October 2009, p 6 – 9. (http://mri.scnatweb.ch/dmdocuments/mri_news_no3_Shrestha.pdf)

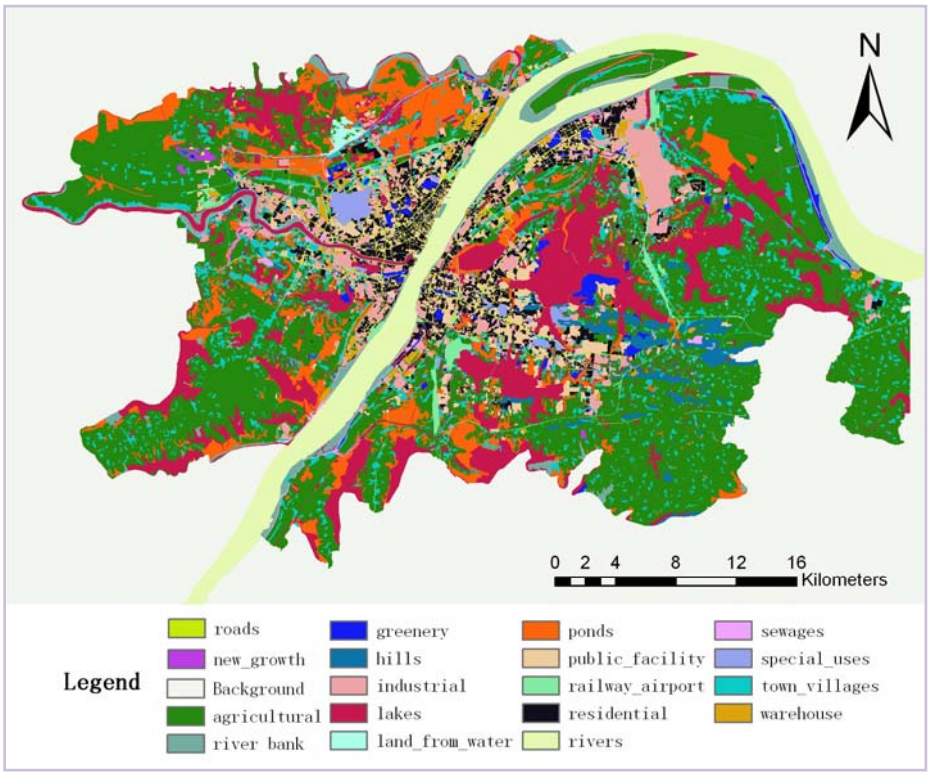
# 1.5 ARCP2009-09CMY-Sellers

## Peri-Urban Development and Environmental Sustainability: Examples from India and China

**Project Leader:** Dr. Jefferey M. Sellers
University of Southern California
UNITED STATES OF AMERICA
Tel: +1 213 740 1684
Fax: +1 213 740 8893
Email: sellers@usc.edu

**APN Funding:** US$80,000 (For 2 Years)

**Project Summary:**
Large-scale urban development is likely to be one of the primary sources of environmental change in Asia over the next decades, and more of this development will take place in India and China than in any other two countries. Understanding the dynamics and the ecological consequences of urban expansion is critical in crafting policies and institutions to manage it properly. Comparative analysis of these processes within and between different countries is an indispensable prerequisite to such an understanding.



This study has assembled remote sensing, demographic, environmental and other data over a period of 20-30 years for a systematic comparison of urbanising regions in China and India. Data on trajectories of urban development in parallel samples of ten (10) Chinese and ten (10) Indian cities are being compared to examine how urban forms have changed in the consequences of environmental change. The analysis has revealed strikingly different transformations of urban form in Chinese and Indian urban regions.

In China, peri-urban expansion has proceeded consistently regardless of city size in coastal regions with strong external investment, but less systematically in some inland regions and little in others. In India, dramatic peri-urban expansion in Chennai and most recently in Bangalore contrasts with more limited spread of settlement in other large regions with higher external investment, such as Mumbai and Hyderabad. Indian patterns of peri-urban expansion also appear more irregular than corresponding Chinese patterns.

The ongoing analysis is examining the sources of these variations in different land market institutions, policy-making structures, national policy, infrastructure investment, transnational investment flows and patterns of rural-urban migration. Detailed qualitative and quantitative case studies in several paired urban regions of China and India have begun to scrutinise these dynamics more closely. Fieldwork will provide ground-truth checks and aid data collection. The first in a series of meetings with stakeholders has provided lessons for policy and aided the analysis.

**Publications:**


- Han, S.S. 2009. Urban expansion in contemporary China: What can we learn from a small town? *Land Use Policy* (forthcoming).
- Huang, J., Sellers, J. and Lu, X.X. 2009. Chinese Urban Form in the Past Three Decades: Pattern and Process. Presented at Shanghai Planning Conference, July.
- Uttam, K., Muhopadhyay, C., and Ramachandra, T.V. 2009. Spatial data mining and modeling for visualization of rapid urbanization (Invited article under review).
- Sellers, J., Han, S.S. and Ramachandra, T.V. 2009. Institutional Infrastructures and Patterns of Urban Development in China and India. Working paper, University of Southern California.

# 1.6 ARCP2009-06CMY-Braimoh

## Managing Ecosystem Services in Asia: A Critical Review of Experiences in Montane Upper Tributary Watersheds (ECOSMAG)

**Project Leader:** Dr. Ademola Braimoh
Global Land Project
Hokkaido University
JAPAN
Tel: +81 11 706 4531
Fax: +81 11 706 4534
Email: abraimoh@glp.hokudai.ac.jp

**APN Funding:** US$90,000 (For 2 Years)

**Project Summary**
Policy-makers find it hard to incorporate the benefits derived from ecosystems into decision-making due to difficulties in characterising ecosystem services and the challenges of negotiating accountable systems of governance and compensation. This project aims to develop a framework for analysing ecosystem services and governance structure vis-à-vis the delivery of ecosystem services to different stakeholders (http://www.glp.hokudai.ac.jp/ecosmag). Case studies in China, Indonesia and Thailand characterise ecosystem services, conduct their economic valuation and analyse conservation institutions using a multi-stakeholder perspective. Activities at the three field sites (Mae Hae Watershed, Supa Longling Watershed, Sunghai Kahayan Watershed) are well in progress.

A stakeholders' meeting in the Upper Mae Hae Watershed in northern Thailand's Chiang Mai province discussed the roles and functions of water-use and water–conservation institutions. The project on watershed services, conflict and gender were introduced stressing the team's commitment to ensure that the research will benefit the members. This initial watershed-wide meeting is being followed up by a series of "stream-level forums" and a detailed household survey on land and water use. This more local consultation and document, when fed back to the network, may help strengthen key local institutions governing ecosystem resources in the area.

Preliminary data gathering indicated that the communities in Supa River Watershed do have conventional rules to protect forests; they also contribute substantially to the costs of forest maintenance. However, their access to watershed services is limited due to insufficient power to negotiate, absence of a legal framework to support payment and compensation for watershed services, and ambiguous property rights. A stakeholders' forum will be held to further clarify the governance issues, followed by detailed socio-economic surveys addressing equity in access to watershed services.

The Kahayan Watershed stakeholder meeting was held at the Center for International Cooperation in Sustainable Management of Tropical Peatland (CIMTROP), Palangka Raya University in Central Kalimantan. The participants itemised watershed management problems including the intrinsic geomorphology of the area that predisposes it to erosion, flooding and dryness, poor coordination of land use and forest concessions, and inconsistent and weak enforcement of conservation regulations. Other problems included poverty leading to bad land management, erosion and sedimentation, which decrease fish diversity downstream, persistent conflicts among upstream and downstream land users, soil and water pollution from illegal mining and tree crops production, and waste disposal into the Kahayan River. These issues have guided the design of questionnaires for an ongoing socio-economic study. This will help in strengthening land-use planning and developing mechanisms to better manage ecosystem services in the watershed.

# 1.7 ARCP2009-07CMY-Zou

## Temperature Sensitivity of Soil $CO_2$ Efflux as Altered by Rubber Tree Plantations in Southeast Asia

**Project Leader:** Dr. Xiaoming Zou
Xishuangbanna Tropical Botanical Garden
CHINA
Tel: +86 691 871 5457
Fax: +86 691 871 5070
Email: xzou2000@yahoo.com

**APN Funding:** US$70,000 (For 2 Years)

**Project Summary:**
Rapid economic growth occurring in China and Southeast Asian countries has increased demands for rubber, an essential natural material for a variety of industries including vehicle manufacture. This increase is leading to expansion of rubber tree plantations in the region. Large areas of natural forest have been converted to rubber tree plantations, and this conversion can have severe ecological consequences such as altered carbon cycling. Effects of changing climate on soil carbon fluxes can only be assessed by field studies in different land-use areas. A better understanding of ecosystem responses to tropical land-use changes will lead to improved land-use policies to promote sustainable economic growth in the region.

Initial findings from this study during its first year implementation showed that converting tropical forests to rubber plantations can lead to the invasion of exotic earthworms, consequently alter the turnover rates of soil labile organic carbon (LOC) and its distribution along soil profile. The study also demonstrated that the presence of exotic earthworm *Pontoscolex corethrurus* for 20 months increased LOC (up to 35%) protected by aggregates in surface soil layer (0-5 cm). In contrast, the presence of this earthworm increased LOC unprotected by the aggregates and the turnover rate of LOC protected by the aggregates in subsurface soil layer (5-15 cm). Earthworms' redistribution of LOC between the protected and unprotected forms and along soil profile may affect long-term soil carbon cycling.

**Publications:**

- Zhang, M., D. A. Schaefer, and X. M. Zou. In press. Alteration of soil labile organic carbon by invasive earthworms (*Pontoscolex corethrurus*) in tropical rubber plantations. European Journal of Soil Biology.
- Zhang, M., and X.M. Zou. 2009. Comparison of soil C and N in rubber plantation and seasonal rain forest. *Chinese Journal of Applied Ecology* 20: 1013-1019.

# 1.8 ARCP2009-08CMY-Iqbal

## Assessment of Food and Water Security in South-Asia under Changing Climate Scenario Using Crop Simulation and Water Management Models, and Identification of Appropriate Strategies to Meet Future Demands

**Project Leader:** Dr. M. Mohsin Iqbal
Global Change Impact Studies Centre (GCISC), National Centre for Physics (NCP) Complex, PAKISTAN
Tel: +92 51 921 9785/ +92 51 280 0239
Fax: +92 51 921 9785
Email: mohsin.iqbal@gcisc.org.pk; gcisc@comsats.net.pk

**APN Funding:** US$70,000 (For 2 Years)

**Project Summary:**
South Asia is one of the most densely populated regions host to one-fifth of the world population. Population is increasing at a rapid rate calling for an increase in food production. The economies of South Asian countries are primarily agrarian and hence prone to vagaries of weather and changing climate. They also share common problems. Bangladesh, Nepal and Sri Lanka have rain-fed systems whereas Pakistan and India have predominantly irrigated systems. The productive resources of land and water in these countries are limited due to urbanisation, industrialisation, land degradation, global warming, etc.

Climate change is the single factor, which is likely to exert direct and indirect impacts on water resources, the main driver of food production, and on food production itself. Concerns have been expressed as to whether there will be enough food for the growing population during the 21st century. For a nation to be food-secure, not only must its most productive regions continue to be productive, but also its potentially food-insecure areas should be made food-secure. This project aims to assess the food security situation of the region, under water availability scenarios, at different time slabs, and to identify appropriate adaptation strategies to manage the needed food.

In March 2009, a Crop Simulation Modelling Training Workshop was organised through additional funding provided by APN to build the capacity of the participating country scientists, especially Sri Lanka and India. After the training workshop the simulation work on crop and water management models started. The preliminary findings of the study are scheduled to be presented in the forthcoming Preliminary Results Workshop in Islamabad, Pakistan.

**Publication:**

- Iqbal, M. M., Goheer, M. A. and Khan, A. M. 2009. Climate Change Aspersions on Food Security of Pakistan. *Science Vision* (In Press).

# 1.9 ARCP2009-09NSY-Skole

## Developing Smallholder Agroforestry Carbon Offset Protocols for Carbon Financial Markets – Twinning Sustainable Livelihoods and Climate Mitigation

**Project Leader:** Dr. David Skole
Michigan State University
UNITED STATES OF AMERICA
Tel: +1 517 355 0181
Fax: +1 517 355 0186
Email: skole@msu.edu

**APN Funding:** US$40,000 (For 1 Year)

**Project Summary:**
Land-use change, particularly deforestation, is responsible for approximately 20% of all anthropogenic $CO_2$ emissions. Replacement of lost vegetation can sequester atmospheric $CO_2$, offsetting emissions. Carbon financial markets are now an accepted mechanism for trading such offsets. Governments, industries, communities, and individuals are actively participating in carbon abatement through both compulsory and voluntary carbon markets. Forestry-related projects, unfortunately, have lagged behind other mitigation projects in these markets, and small-holder agro-forestry carbon offset projects are almost non-existent.

This project is developing small-holder agroforestry protocols for the Chicago Climate Exchange working directly with farmers and communities in Lao PDR, Thailand, and Viet Nam. The expected project outcomes will include the development of at least three prototype small-holder agroforestry projects and the drafting of related agroforestry protocols that define the measuring, monitoring, and validation methods for carbon sequestration.

# 1.10 ARCP2009-10NSY-Gautam

## Assessment of Role of Community Forests (CFs) in $CO_2$ Sequestration, Biodiversity and Land Use

**Project Leader:** Dr. Chinta Mani Gautam
Nepal Development Research Institute (NDRI)
NEPAL
Tel: +917 1 555 4975
Fax: +917 1 501 3562
E-mail: sriju@ndri.org.np

**APN Funding:** US$38,050 (For 1 Year)

**Project Summary:**
Community Forestry (CF), a successful program for protecting and rehabilitating the forest, has received the highest priority from the Government of Nepal since 1978. However, studies on $CO_2$ sequestration, species diversity, and land-use change relevant to CFs are limited. Therefore, this study aims to estimate $CO_2$ sequestration and document species diversity in selected CFs and analyse the role of CF in land-use change.

The major project activities include: Focus Group Discussions (FGD) and Participatory Rural Appraisals (PRA) in selected CFs regarding the process of land-use change and knowledge of biodiversity among the locals; survey of vegetation in selected CFs; interpretation of satellite images for mapping land-use change; analysis of biodiversity; estimation of carbon deposits; sharing of relevant information and knowledge from collaborating countries; and the organisation of stakeholder meeting and workshop in Kathmandu. The key outcomes from the project are: 1) Preparation of a background paper with empirical evidence to support policy processes; 2) documentation of the role/contribution of CFs in $CO_2$ sequestration; and 3) evaluation of the impact of CFs on land-use/cover change. In addition, the project outcomes are expected to be used in preparing the CF operational plan, which describes an action plan, management strategy and guidelines to operate a particular CF; and in raising the awareness in carbon trading among the users and management authorities.

# 1.11 ARCP2009-11NSY-Roy

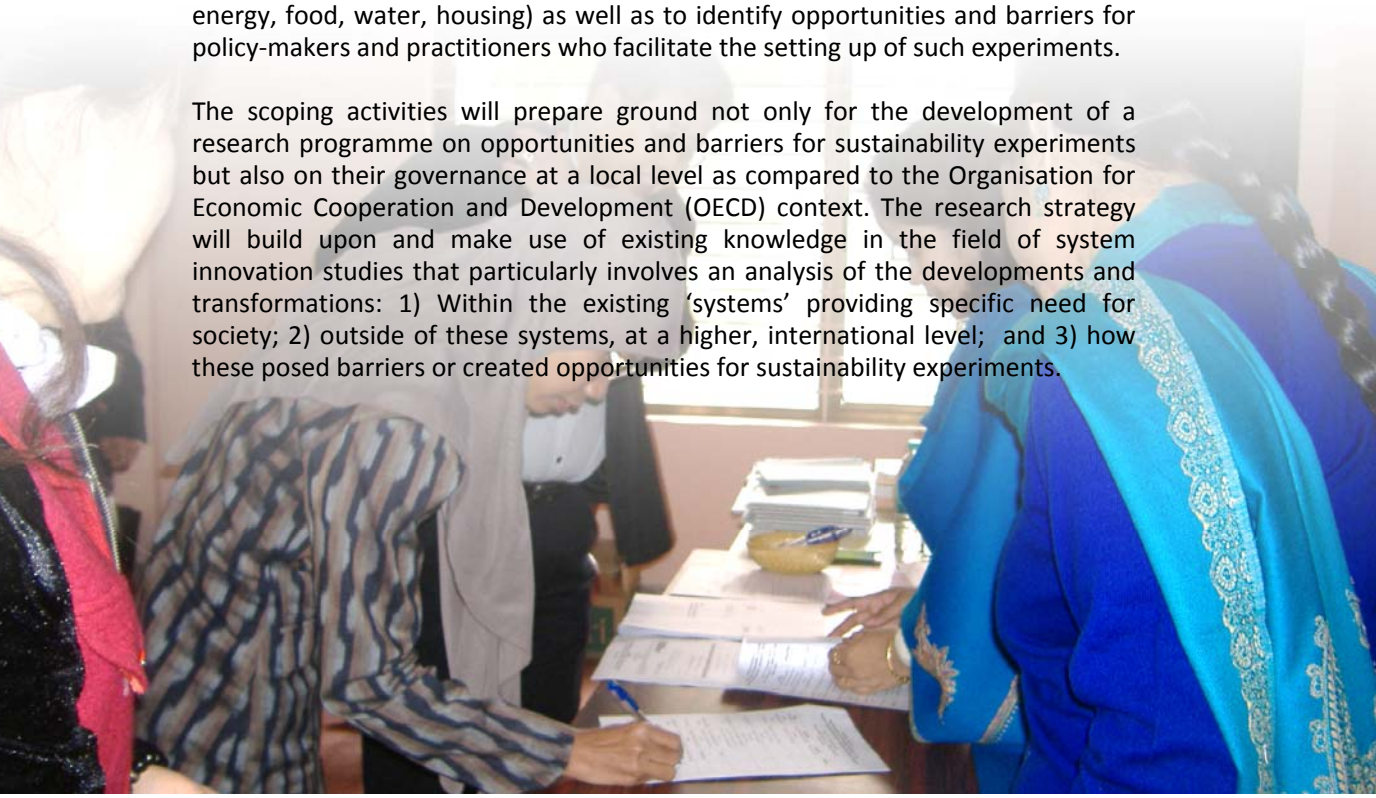
## Role of Experiments in Sustainability Transitions in Asia

**Project Leader:** Prof. Joyashree Roy
Jadavpur University
INDIA
Tel: +91 33 6414 7760
Fax: +91 33 2412 7905
Email: jroy@cal2.vsnl.net.in

**APN Funding:** US$40,000 (For 1 Year)

**Project Summary:**
This project will hold two scoping workshops to develop an international research program on the role of innovative development project-level experiments in 'sustainability transitions' in Asia. Workshops are intended to bring together an international group of academics and practitioners engaged in this unique field to develop a collaborative research strategy for inventorying, classifying and analysing sustainability experiments in an international context. The ultimate aim is to understand how experiments can come to influence Asian development pathways and transform some of the unsustainable systems of provision (mobility, energy, food, water, housing) as well as to identify opportunities and barriers for policy-makers and practitioners who facilitate the setting up of such experiments.

The scoping activities will prepare ground not only for the development of a research programme on opportunities and barriers for sustainability experiments but also on their governance at a local level as compared to the Organisation for Economic Cooperation and Development (OECD) context. The research strategy will build upon and make use of existing knowledge in the field of system innovation studies that particularly involves an analysis of the developments and transformations: 1) Within the existing 'systems' providing specific need for society; 2) outside of these systems, at a higher, international level; and 3) how these posed barriers or created opportunities for sustainability experiments.



# 1.12 ARCP2009-12NSY-Karve

## Biochar for Carbon Reduction, Sustainable Agriculture and Soil Management (BIOCHARM)

**Project Leader:**
Dr. Priyadarshini Karve
Appropriate Rural Technology Institute (ARTI)
INDIA
Tel: +91 20 243 90348
Fax: +91 20 243 90348
Email: pkarve@arti-india.org

**APN Funding:** US$40,000 (For 1 Year)

**Project Summary:**
Biochar is a by-product of the combustion of biomass in zero or low-oxygen environments. Depending on the fuel stock used, a large proportion of biochar is made up of elemental carbon. As such, biochar is a potentially highly valuable way of storing carbon in soils in a form, which will not rapidly mineralise and be released back to the atmosphere as $CO_2$.

Biochar addition to agricultural soils has been reported to have some important agronomic benefits. This project is aimed at original research on biochar in Cambodia, the Philippines and India for carbon storage (carbon credits) and agricultural benefit. Although some results have emerged from various parts of the world regarding the benefits of using biochar for soil amendment, many scientific and socio-economic questions remain unanswered.

The expected outcome of the project is a better understanding of the role of biochar for carbon storage and agricultural improvements in a range of environmental, socio-economic and material contexts in three countries which themselves reflect a range of circumstances and policy conditions. Policy recommendations for further development of biochar as a component of national climate change, sustainable energy and agricultural policies are expected to emerge from the project.

## 1.13 ARCP2009-13NMY-Sthiannopkao

## Collaborative Research on Sustainable Urban Water Quality Management in Southeast Asian Countries: Analysis of Current Status (comparative study) and Development of a Strategic Plan for Sustainable Development

**Project Leader:** Dr. Suthipong Sthiannopkao
International Environmental Research Center (IERC)
Gwangju Institute of Science and Technology (GIST)
REPUBLIC OF KOREA
Tel: +82 62 970 3390
Fax: +82 62 970 3394
E mail: suthi@gist.ac.kr, suthisuthi@hotmail.com

**APN Funding:** US$40,000 (For 1 Year)
(Year 2 expected funding is US$40,000)

**Project Summary:**

This project is a collaborative research on sustainable urban water quality management in Southeast Asian (SEA) countries and aims to establish a Centre of Excellence in the field of sustainable urban water quality management in the region. It is composed of three (3) main parts: Part I - Scientific research; Part II - Database development; and Part III - Implementation of a strategic plan through capacity development programmes. Part I includes a comparative study in SEA on: 1) Current and future of urbanisation expansion; 2) Current water management policies; 3) Water quality impacts caused by urban activities and climate change and; 4) Development of a strategic plan including capacity development programmes.

Part II is composed of five (5) sub-databases: 1) Information source; 2) Database on water management policy and organisation involved; 3) Database on technologies for controlling water pollution; 4) Database on water quality monitoring, and characteristics; and 5) Database on population, land-use, socio-economy, climate and urban city planning. It is expected that the results of Part I will be used as input data into Part II for the benefits of policy-makers in each SEA studied city. Part III will be conducted in collaboration with the project's Learning Alliances Group (LAG), which will be established in four (4) SEA studied cities through capacity building programmes via increased experience, education and qualifications of local practitioners.

# 1.14 ARCP2009-14NMY-Phua

## Integrated Prediction of Dipterocarp Species Distribution in Borneo for Supporting Sustainable Use and Conservation Policy Adaptation

**Project Leader:** Dr. Phua Mui How
School of International Tropical Forestry
Universiti Malaysia Sabah
MALAYSIA
Tel: +60 88 320000 Ext. 8773
Fax: +60 88 320876
Email: pmh@ums.edu.my

**APN Funding:** US$35,350 (For 1 Year)
(Year 2 expected funding is US$39,650)

**Project Summary:**
Borneo's lowland rain forest dominated by dipterocarp species has been subject to exploitation under different policy regimes leading to degradation and deforestation. Nevertheless, crucial information on the species distribution in both regimes are seriously lacking for sustainable management and conservation efforts. The project involves collaboration between scientists and researchers from various institutions such as universities and government agencies in the Asia-Pacific region.

This project aims at filling the gap of missing information about the dipterocarp species distribution and conservation gap at a landscape scale through an integrated approach that combines remote sensing, Geographic Information System (GIS) and field data. The integrated approach aims at deriving crucial information on the distribution of the dipterocarp species, the most important timber species in Borneo. The project will also design hybrid mechanism that combine incentive and market mechanisms to examine the local people's willingness to participate in keeping the forest carbon.

# 1.15 ARCP2009-15NMY-Marambe

## Vulnerability of Home Garden Systems to Climate Change and its Impacts on Food Security in South Asia

**Project Leader:** Prof. Buddhi Marambe
Faculty of Agriculture
University of Peradeniya
SRI LANKA
Tel: +94 812 395100
Fax: +94 812 395110
Email: bmarambe@pdn.ac.lk; marambeb@gmail.com

**APN Funding:** US$35,000 (For 1 Year)
(Year 2 expected funding is US$40,000)

**Project Summary:**
Food security in rural South Asia and food production in home gardens is intrinsically related; hence, climate change may have significant implications on food security. According to recent studies conducted in Sub Saharan Africa, home gardens are more prone to cushion the shocks arising from climate change than those by monocultures, and farmers use a variety of adaptation measures to mitigate the adverse effects of climate change.

The influence of climate change on food production and food security has not been well established yet. Food production in many developing countries, especially in South Asia, is carried out in home gardens. This study assesses the effects of climate change on home garden systems, which are the predominant types of highland farming in South Asia, under changing climate using bio-economic models. The present study will take stock of the trees, crops and farm animals in the home gardens to establish the current status. The extent to which climate shock has influenced the present status of home gardens will be investigated.

# 1.16 ARCP2009-16NMY-Wang

## Building Asian Climate Change Scenarios with Multi-Regional Climate Models Ensemble

**Project Leader:** Dr. Shuyu Wang
Institute of Atmospheric Physics
Chinese Academy of Sciences
CHINA
Tel: +86 10 8299 5159
Fax: +86 10 6202 8604
Email: wsy@tea.ac.cn

**APN Funding:** US$39,760 (For 1 Year)
(Year 2 expected funding is US$40,000)

**Project Summary:**
The design and implication of this project will improve the simulation skills of regional climate models and meet the urgent needs of providing accurate regional climate change information for community impacts and assessments, which is one of the high priority areas in climate change studies. The project aims to build high-resolution climate change scenarios for Asia with the ensemble of nine (9) regional climate models' outputs. It will also provide a full evaluation and assessment of uncertainty in the scenarios.

The design and implementation of the project are based on the requirement of stakeholders and impact/adaptation communities, which demand high resolution information about climate change, variability and extreme events so as to enable and support effective adaptation decisions to reduce vulnerability to regional-scale climate change.

This project intends to couple nine (9) Regional Climate Models (RCMs) from five (5) countries with at least one Global Climate Model (GCM), therefore high-confidence regional climate change projection with qualified uncertainty range will be provided. On the agreement of participating groups, two sets of simulations for both contemporary and future climate will be carried out. The new ensemble technique will be developed and used to provide detailed assessment and evaluation of Asian regional climate projection and uncertainty. Therefore, highly confident climate change information can be provided to impact/adaptation research communities, with an envelope analysis of ensembles and uncertainty range. The project outputs will also contribute to the Intergovernmental Panel on Climate Change (IPCC) 5$^{th}$ Assessment Report by providing detailed projections of regional climate in Asia.

# 1.17 ARCP2009-17NMY-Luck

## The Effects of Climate Change on Pests and Diseases of Major Food Crops in the Asia Pacific Region

**Project Leader:**
Dr. Joanne Elizabeth Luck
Department Primary Industries Victoria
Cooperative Research Centre National Plant Biosecurity
AUSTRALIA
Tel: +61 3 9210 9248
Fax: +61 3 9800 3521
Email: jo.luck@dpi.vic.gov.au

**APN Funding:** US$78,240 (For 2 Years)

**Project Summary:**
An understanding of any increased impact from pests and diseases of key food crops under climate change will enable the Asia-Pacific agricultural industries and government agencies to better prepare and adapt to climate change, through changes to existing policy and practices such as time of planting, new resistant varieties, changes to disease management protocols and shift in geographic plantings.

The project aims to investigate the impact of climate change on key pests and diseases of major food crops in the Asia-Pacific region. The project started with a workshop at the Bidhan Chandra Krishi Viswavidyalaya University (BCKV), a state agricultural university in Kalyani, India, 15-16 December 2009 in conjunction with a national symposium on "Climate Change, Plant Protection and Food Security." The main objectives of the workshop are to: 1) Assess the research being done on climate change and pests and diseases of important crops in the Asia-Pacific region; 2) Agree on a common crop and disease to focus on as a project case study; and 3) Review the agrometeorology and pest modelling tools and historical data sets from India, Bangladesh and Australia as a foundation for the present project. The general aim is to identify the climatic risks and then determine how current practices and policies could be adapted to reduce these risks.

# 1.18 ARCP2009-18NMY-Schaefer

## Quantifying the Role of Dead Wood in Carbon Sequestration

**Project Leader:** Dr. Douglas A. Schaefer
Associate Professor of Soil Ecology
Xishuangbanna Tropical Botanical Garden, Kunming Branch
CHINA
Tel: +86 871 516 1199
Fax: +86 871 516 0916
Email: xiedaoan@xtbg.ac.cn

**APN Funding:** US$39,270 (For 1 Year)
(Year 2 expected funding is US$39,730)

**Project Summary:**
Dead woody debris in the world's forests contains between 40 and 60 petagrams (Pg; billion metric tons) of carbon, with almost 3 Pg C per year being returned to the atmosphere from this pool as $CO_2$. This return of carbon to the atmosphere is controlled by fungal decomposition of lignin, a particularly resistant bio-polymer. The biology and genomics of fungal lignin decomposition have been extensively studied because of their roles in damaging built (wooden) structures, and their ability to "liberate" cellulose for bio-energy processes. These studies have identified a large number of physical, chemical and biological "control points" with the potential to slow fungal lignolysis.

Detailed examinations of wood decomposition have shown a ten-fold or greater variation in rates, even after controlling for the factors considered to have the strongest effects (temperature, moisture content and wood density). Therefore, in forest wood decomposition, additional factors are in play with the potential to be modified. However, no study has previously attempted to alter wood decomposition in forests beyond changing water content and soil contact area. This APN-funded research project's main goal is to quantify the role of dead wood in carbon sequestration, coupled with woody material manipulations in a variety of Asian forests, and under a wide range of soil conditions.

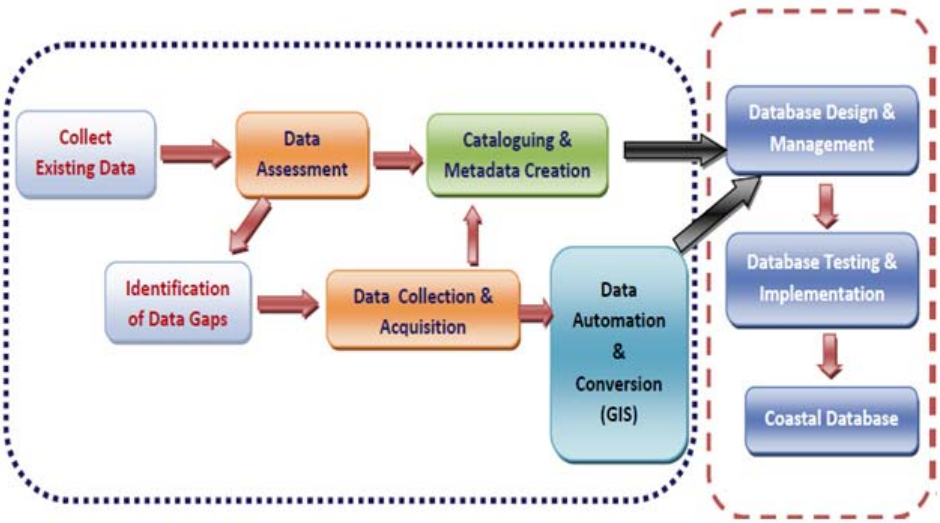
# 1.19 ARCP2009-19NMY-Bai

## Asian Coastal Ecosystems: An Integrated Database and Information Management System (DIMS) for Assessing Impact of Climate Change and its Appraisal

**Project Leader:** Dr. Ramani Bai V.
Department of Civil Engineering, Faculty of Engineering
University of Nottingham Malaysia Campus
MALAYSIA
Tel: +6 3 8924 8604/8106
Fax: +6 3 8924 8017
Email: Ramani-Bai.V@nottingham.edu.my

**APN Funding:** US$39,270 (For 1 Year)
(Year 2 expected funding is US$39,730)

**Project Summary:**
The Asian coastal region is defined by environmental and economic conditions that transcend state and country boundaries, representing a host of critical integrating and conflicting factors such as mineral resources, fisheries production, ecological habitats for marine life and waterfowl, and human demands with subsequent anthropologic impacts. As more research is being conducted in the region to help understand these conditions and factors, it becomes crucial to make research results, information, and data accessible to all. Understanding the Asian coastal region's ecosystems and its changes is dependent on the quality of documenting and modelling the interrelationships of physical, chemical, and biological parameters.



From several workshops, the need for a database clearinghouse for Asian coastal region information was the number one recommendation. With the four institutions identified, the project would attempt to develop an Integrated Database and Information Management System (DIMS), an easily accessible information outlet. A holistic and integrated approach will be taken to achieve such goal.

**Publications:**


- Ramani Bai, V. and Mohan, S. 2009. Groundwater Model for Investigating Seawater Intrusion Hazards. *Proc. of Int. conference on Disaster Mitigation and Management (ICDMM-2009)*, Dec 16-18, 2009, PSNA, Tamil Nadu, India.
- Mohan, S. and Janardhanan, G. 2009. Climate Change: Is it a disaster? *Proc. of Int. conference on Disaster Mitigation and Management (ICDMM-2009)*, Dec 16-18, 2009, PSNA, Tamil Nadu, India.
- Ramani Bai, V., Tkalich, P. and Mohan, S. 2008. Hydro-chemical pollution of coastal groundwater resource and impact on coastal eco-system. *IWA journal of Water Research* (manuscript submitted).

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# Section Two

## Projects funded under the CAPaBLE Programme

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# 2.1 CBA2009-01CMY-Ailikun

## Capacity Building for Drought Monitoring and Studying in Monsoon Asia under the Framework of the Asian Water Cycle Initiative (AWCI)

**Project Leader**: Dr. Ailikun
Key Laboratory of Regional Climate-Environment Research
for Temperate East Asia (RCE-TEA), Institute of Atmospheric Physics
Chinese Academy of Sciences, CHINA
Tel: +86 10 8299 5264
Fax: +86 10 8299 5161
Email: aili@mairs-essp.org; aili@tea.ac.cn

**APN Funding:** US$77,500 (For 2 Years)

**Project Summary:**
This two-year project, now on its final year, aims to: 1) share and improve the drought monitoring capability in various Asian countries; 2) set up a drought monitoring and researching network in related Asian countries; and 3) help develop the early warning system of drought hazard in related countries. It has conducted three (3) scientific workshops and one (1) training workshop in 2009. The individual drought group meeting was held in May 2009 in Bangkok, hosted by the Global Change System for Analysis, Research and Training (START) Southeast Asia Regional Centre. The second individual drought group meeting convened in October 2009 in Thailand and hosted by Chiang Mai University. The APN-AWCI joint training workshop took place in Tokyo in mid-December 2009 hosted by the University of Tokyo.

The AWCI drought monitoring and research working group now includes 18 participants from ten (10) countries in Asia. The scientific supporting team includes five (5) scientists that provide advice on the algorithms and validation of soil moisture products retrieval from remote sensing datasets. In 2009, the project has collected ground observation data from Mongolia, China, Bangladesh, Pakistan and Viet Nam. Both Advanced Microwave Scanning Radiometer – Earth Observing System (AMSR-E) and Moderate Resolution Imaging Spectroradiometer (MODIS) products are being used in the retrieval of soil moisture and drought indices in the related countries.

## 2.2 CBA2009-02CMY-Ishida

### The Global Earth Observation System of Systems Asian Water Cycle Initiative Observation Convergence and Data Integration (GEOSS/AWCI/OCDI) for Water Cycle Research and Water Resources Management under Climate Change in Asia

**Project Leader:**
Mr. Chu Ishida
Committee on Earth Observation Satellites (CEOS)/Japan Aerospace Cooperation Agency (JAXA)
JAPAN
Tel: +81 3 5841 6106
Fax: +81 3 5841 6130
Email: ishida.chu@jaxa.jp

**APN Funding:** US$75,000 (For 2 Years)

**Project Summary:**
Recognising the need for accurate, timely, long-term, water cycle information as a basis for sound and effective water resources and risk management and with regards to the ongoing initiatives pursuing to meet this need, the GEOSS/AWCI/OCDI project was initiated. The project follows up on the data focus of the International Integrated Water Data Access and Transfer in Asia (IIWaDATA) project (ARCP2007-02CMY) and is contributing to the development of a sustainable scheme for water cycle data collection, sharing, exchange, and management at the regional level in Asia, in cooperation with national governments, institutes and research communities and other international organisations.

The GEOSS/AWCI/OCDI project involves 19 participating countries and 18 river basins in the Asia-Pacific region, and develops an information system of systems for promoting the implementation of integrated water resources management (IWRM).

Through a series of meetings, the IIWaDATA project established a mutual consensus among the participating countries and international organisations that defines data sharing and exchanging policy and responsibilities for data processing, management and archiving. This strong cooperative framework has evolved into a large regional initiative recognised by the Group on Earth Observations (GEO) as a GEOSS activity. The project has been further significantly contributing to the development of the Data Integration and Analysis System (DIAS) that was launched in 2006 as part of the Earth Observation and Ocean Exploration System, which is one of five National Key Technologies defined by the 3rd Basic Program for Science and Technology of Japan.

**Project Website:** http://monsoon.t.u-tokyo.ac.jp/AWCI/

## 2.3 CBA2009-03NSY-Bishry

### Project Scoping and Training Workshop for REDD in Indonesia, Cambodia, and Lao PDR

**Project Leader:** Dr. Rony Bishry
The Agency for the Assessment and Application of Technology (BPPT)
INDONESIA
Tel: +62 21 316 9740
Fax: +62 21 316 9720
Email: rbishry2000@yahoo.com

**APN Funding:** US$24,400 (For 1 Year)

**Project Summary:**
Land-use change, particularly deforestation, is responsible for approximately 20% of all anthropogenic $CO_2$ emissions. Nearly 90% of all $CO_2$ emissions in Indonesia are from deforestation, ranking it third in terms of annual $CO_2$ emissions. Deforestation rates in Indonesia and Lao PDR have remained consistently high between 1990–2000 and 2000–2005; the rate in Cambodia has increased (FAO FRA 2005). Market opportunities are emerging to support interventions that reduce deforestation rates under Reduced Emissions from Deforestation and Degradation (REDD) projects. The protocols and methods for establishing REDD projects are complex. The objectives of this project are: 1) Training and capacity development in understanding REDD and methodologies for implementing REDD activities; and 2) initial identification of potential REDD activities in each of the three countries.

**Publications:**

- Rony Bishry. 2010. "Reducing Emissions from Deforestation and Degradation: A New Commitment or Financial Resources?" (Invited paper), Centre for Environment Education and Technology (CEET) Conference on Climate Change, Kottayam - Kerala – India; February 2010.
- Skole, D.L., W.H. Chomentowksi, M.A. Cochrane, (submitted). Forest Fragmentation, Biomass Collapse and Carbon Flux in the Brazilian Amazon, *Science*;

**Project Website**: http://neonet.bppt.go.id/redd/

## 2.4 CBA2009-04NSY-Visarto

### Workshop on Climate and Agricultural Risk Management

**Project Leader**: Dr. Preap Visarto
Plant Protection Sanitary and Phytosanitary Department
General Directorate of Agriculture,
Ministry of Agriculture Forestry and Fisheries
CAMBODIA
Tel: +855 11 622 916
Fax: +855 23 883 267
Email: preapvisarto777@yahoo.com

**APN Funding:** US$30,000 (For 1 Year)

**Project Summary:**
This training/symposium, which aimed to improve the management of climate-associated risks in agriculture, including modified risk profiles linked to climate change scenarios successfully convened on 19-22 November 2009 in Phnom Penh, Cambodia. The training/symposium consisted of two parts. The first part was a three-day training activity in the area of climate, crop, disease and pest modelling, thus building on the outputs of the original APN project ARCP2007-06CMY. The second part was a four-day international symposium on "Climate Risk and Agricultural Management" which focussed on information exchange and regional priority setting.

This capacity building, information exchange and priority setting activity was designed by the International Climate and Agricultural Risk Management (CARM) Network. This Network arose from the APN-funded project "Climate and Crop Disease Risk Management: An International Initiative in the Asia-Pacific Region" (ARCP2007-06MY), led by Associate Professor Huda, University of Western Sydney, Australia.

The symposium provided a venue for sharing and discussing climate variability impacts on crops. The project activities led to an improved understanding, analysis and forecasting of climate variability, generated data from other countries in the region, and initiated ideas for better knowledge gain. All these contributed to sound strategies of reducing climatic risk in the agriculture sector.

## 2.5 CBA2009-05NSY-Salinger

### International Workshop on the Content, Communication and Use of Weather and Climate Products and Services for Sustainable Agriculture

**Project Leader:** Dr. Michael James Salinger
School of Environment, University of Auckland
NEW ZEALAND
Tel: +64 9 373 7599 ext 84932
Fax: +64 9 373 7494
Email: j.salinger@auckland.ac.nz

**APN Funding:** US$25,000 (For 1 Year)

**Project Summary:**
The workshop brought together leading experts in the field who prepared and presented state-of-the-art discussion papers to address the workshop's objectives. The programme was designed to engage all participants in discussions on topics of their interest to facilitate interactive dialogue and develop appropriate recommendations.

The dramatic growth in human population is imposing enormous pressure on existing farming production systems. In addition, farmers are expected to manage the more insidious effects of long-term climate change that may now be occurring at an unprecedented rate. These demand appropriate methods to include development of improved meteorological tools for farmers and better understanding and application of the use and appropriateness of weather and climate information for farmers globally.

The project has provided scientists, particularly from emerging and developing countries, the opportunity to interact with other experts from different regions. It also built capacity in strategic areas for more targeted weather and climate information and forecasting resulting in increased preparedness to sustainable agricultural development, especially in the Asia-Pacific region. Recommendations will also enable policy-makers and civil society to respond effectively in varying weather and climate conditions. Leading experts in several fields presented discussion papers to address the projects objectives.

## 2.6 CBA2009-06NSY-Trieu/Huy

### Capacity Building for Mainstreaming Climate Change Issues into Socio-Economic Development Planning in Viet Nam

**Project Leader:** Dr. Vu Van Trieu and Dr. Luong Quang Huy
Environmental Change and Ecosystems Unit
IUCN Country Office
VIET NAM
Tel: +84 4 3726 1575/6 ext. 127
Fax. +84 4 3726 1561
Email: vuvantrieu@iucn.org.vn; huy@iucn.org.vn

**APN Funding:** US$30,000 (For 1 Year)

**Project Summary:**
The project's goal is to raise awareness and develop capacity to mainstream climate change issues into socio-economic development plans for policy-makers through a series of workshops in the North, Central and South of Viet Nam. Participants are members of the National Assembly and environmental managers from line ministries, who are policy-makers from various economic sectors at both national and provincial levels. The workshops will provide up-to-date information and data on climate change scenarios and impacts; and facilitate discussions on mainstreaming climate change issues into ongoing and future socio-economic development plans.

The proposed workshops series will result in an improved understanding of climate change impacts and challenges in coping and adaptation. Results from the discussions made during the workshops will be formulated into a set of policy recommendations, which will be reviewed by the National Assembly and the Ministry of Natural Resources and Environment, Viet Nam and incorporated into their annual policy recommendation reports for the Government. This set of policy recommendations will be formalised and circulated at the provincial level to be considered in developing provincial adaptation plans.

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# 2.7 CBA2009-07NSY-Larigauderie

## Second DIVERSITAS Open Science Conference: "Biodiversity and Society: Understanding Connections, Adapting to Change": Ensuring a Strong Scientific Contribution from the Asia-Pacific Region

**Project Leader:** Dr. Anne Larigauderie
An International Programme of Biodiversity Science (DIVERSITAS)
FRANCE
Tel: +33 1 4079 80 40
Fax: +33 1 4079 8045
Email: anne@diversitas-international.org

**APN Funding:** US$15,000 (For 1 Year)

**Project Summary:**
This project brought participants from the APN region to the second DIVERSITAS Open Science Conference (OSC2), which took place in Cape Town, South Africa, from 13-16 October 2009.

The conference was entirely dedicated to biodiversity science and its connections to policy. It assembled many perspectives from the natural and social sciences to highlight the causes and consequences of biodiversity change, and discuss solutions to the consequences of this change. The conference featured a mix of plenary lectures, round tables, symposium, oral and poster sessions, presented by invited speakers as well as scientists selected from a call for symposium and a call for abstracts, on the following themes: strengthening biodiversity science; supporting the science-policy interface; and integrated approaches to topical issues and focus on African topics.

The DIVERSITAS OSC2 gave particular importance to the role of science in informing policy. Five (5) science-policy round tables (Intergovernmental Platform on Biodiversity and Ecosystem Services [IPBES], The Economics of Ecosystems and Biodiversity [TEEB], Access and Benefit Sharing [ABS], Convention on Biological Diversity (CDB) 2010 and agro-biodiversity) provided an opportunity for participants to exchange the latest information about key policy developments related to biodiversity and ecosystem services, to hear from various protagonists about the issues at stake for the community, and to provide input into these key debates.

A special issue "Biodiversity, Ecosystem Services and Human Wellbeing" to be published in the new ESSP journal Current Opinion in Environmental Sustainability (COSUST) is under preparation (to be published in April 2010).

**Project Website:** http://www.diversitas-international.org/?page=diversitas_osc2

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# 2.8 CBA2009-08NSY-Almoite

## Scaling-Up Agroforestry Promotion towards Mitigating Climate Change in Southeast Asia

**Project Leader:** Dr. Orlando P. Almoite
Philippine Agroforestry Education and Research Network
College of Forestry and Natural Resources, University of the Philippines Los Baños
PHILIPPINES
Tel: +63 49 536 3657
Fax: +63 49 536 3809
Email: dmmmsu_iawm@yahoo.com, secretariat@pafern.org.ph

**APN Funding:** US$35,000 (For 1 Year)

**Project Summary:**
Recognising the potential of agroforestry in climate change mitigation and adaptation, the Philippine Agroforestry Education and Research Network (PAFERN) conceived this project, which is a regional collaboration of the five (5) member countries of the Southeast Asian Network for Agroforestry Education (SEANAFE), namely: Indonesia, Thailand, Lao PDR, Viet Nam and the Philippines. The overall goal is to foster closer collaboration among the five country networks and the project aims to: 1) Provide capability-building programmes about the roles of agroforestry in mitigating climate change, among the junior agroforestry lecturers in the five participating universities; 2) Develop relevant teaching materials about the multifunctional uses of agroforestry in climate change mitigation; and, 3) Create awareness among different stakeholders, including policy-making bodies about the relevance of agroforestry in sustainable development.

The project has been conducting activities to achieve its goal and the following have been undertaken: 1) Conducted the Consultative Meeting-Workshop of the five country representatives comprising the Project Facilitating Team; 2) Organised the multi-sectoral taskforces in each of the five participating countries; 3) Conducted the Regional Training-Workshop on Scaling-Up Agroforestry Promotion for Climate Change Mitigation and Adaptation in Southeast Asia; 4) Produced the brochure/information material about the potential of agroforestry in climate change mitigation and adaptation; 5) Organised National Agroforestry Roadshows in the Philippines; 6) Developed plans for the implementation of National Agroforestry Roadshows in the four member-countries; and 7) Disseminated information about the project in newsletters and uploaded the same in the PAFERN and SEANAFE websites.


# 2.9 CBA2009-10NSY-Li

## Inter-Agency Collaborative Technologies in Earth Observations (EO) for Global Change Research in the Asia-Pacific Region

**Project Leader:** Prof. Guoqing Li
Centre for Earth Observation and Digital Earth
Chinese Academy of Sciences
CHINA
Tel: +86 10 62655979
Fax: +86 10 62561215
Email: gqli@ceode.ac.cn

**APN Funding:** US$38,000 (For 1 Year)

**Project Summary:**
One of the most difficult problems APN scientists are facing now is the lack of Earth Observations (EO) data and data usage experience. Global Change Research (GCR) mostly depends on multi-disciplinary knowledge and multi-source EO data and scientists in this field mostly have to base their model research and system development on just a few given EO data sets. The next generation of EO data and information infrastructure are focussing on multi-agency collaboration technologies. This provides users with a new way to both utilise and organise their global change studies.

This project aims to: 1) Bring the experience and knowledge on EO from the Committee on Earth Observing Satellites/Working Group on Information Systems and Services (CEOS/WGISS) and on EO data policy from The Committee on Data for Science and Technology (CODATA) to scientists in the APN area; 2) Discuss how to access and use the next generation EO information technology; 3) Find appropriate approaches in building capacity for the Asia-Pacific region regarding global change inter-agency data infrastructure; 4) Develop global change models based on this new EO capability and support; and 5) Fulfil and support the GEOSS activities in the Asia-Pacific region. Another important target of this activity is working with the international leaders from the United Nations Global Alliance for Enhancing Access to and Application of Scientific Data in Developing Countries (UNGAID e-SDDC) to call for and then to promote an Asia-Pacific Area Global Change Users Earth Observation Joint Data Infrastructure (GC-APWG, Global Changing Asia-Pacific Wide Grid).

**Project Website:** http://int.ceode.ac.cn/apn/

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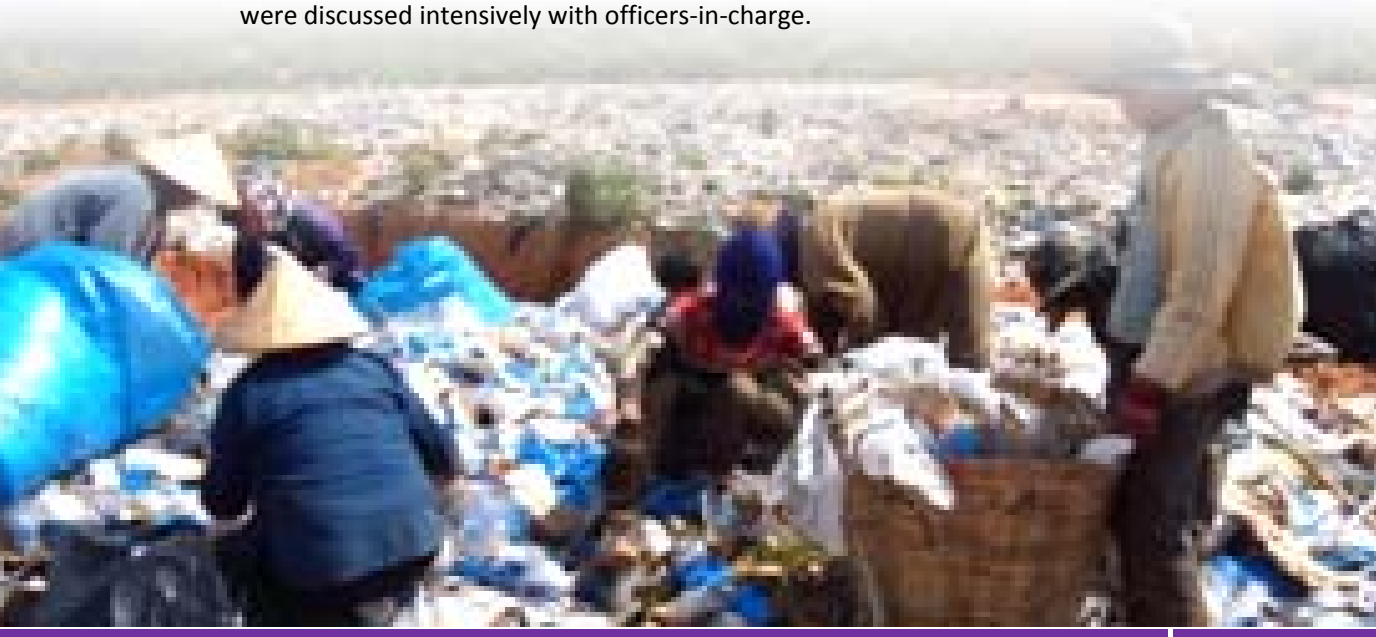
# 2.10 CBA2009-11NMY-Sang-arun

## Promoting Sustainable Use of Waste Biomass in Cambodia, Lao People's Democratic Republic and Thailand: Combining Food Security, Bio-energy and Climate Protection Benefits

**Project Leader:** Dr. Janya Sang-arun
Institute for Global Environmental Strategies (IGES)
JAPAN
Tel: +81 46 826 9573
Fax: +81 46 855 3809
Email: sang-arun@iges.or.jp

**APN Funding:** US$30,000 (For 1 Year)
(Year 2 expected funding is US$36,700)

**Project Summary**
This project aims to promote the use of waste biomass for food and energy production, and identify viable approaches for utilising biomass conversion technology in the target countries of Cambodia, Lao PDR, and Thailand. At the start of the present project, it was endeavoured to involve relevant stakeholders such as national governments, local governments, private sector actors and non-governmental organisations, who are important for sustaining the project activities in the target countries. The project reviewed laws, regulations, notifications and relevant documents on biomass management in the target countries. In addition to field surveys, difficulties facing the operation of waste treatment facilities as well as local government policies on waste-related issues were discussed intensively with officers-in-charge.



Based on the project's reviews and surveys, composting, biogas generation and gasification were found to be viable technologies for converting waste biomass to a useful resource. These technologies are being used for agricultural waste such as rice straw, manure and wood waste, but the application for urban organic waste is not yet widely practiced. Conversion of urban organic waste to compost is found in Bangkok and Rayong, Thailand; and in Phnom Penh, Battambang, and Siem Reap; Cambodia. Biogas generation from urban organic waste is found only in Rayong Thailand.

A project using biomass from urban waste does not exist in Lao PDR. Therefore, local governments in the country are requesting the project to implement a pilot project for their learning. There is a high potential for shared learning and technology transfer between these neighbouring countries. However, piloting of transferred technology is required to ensure successful implementation.

CAPaBLE

# 2.11 CBA2009-12NMY-Togtohyn

## Dryland Development Paradigm (DDP) Application for the Most Vulnerable to Climate and Land Use Change of Pastoral Systems in the Southern Khangai Mountains of Mongolia (DDPPaS)

**Project Leader:** Dr. Chuluun Togtohyn
Institute for Dryland Sustainability (IDS), Environmental RS/GIS Laboratory
National University of Mongolia (NUM)
MONGOLIA
Tel: +97 6 9911 7322
Email: chuluun@warnercnr.colostate.edu

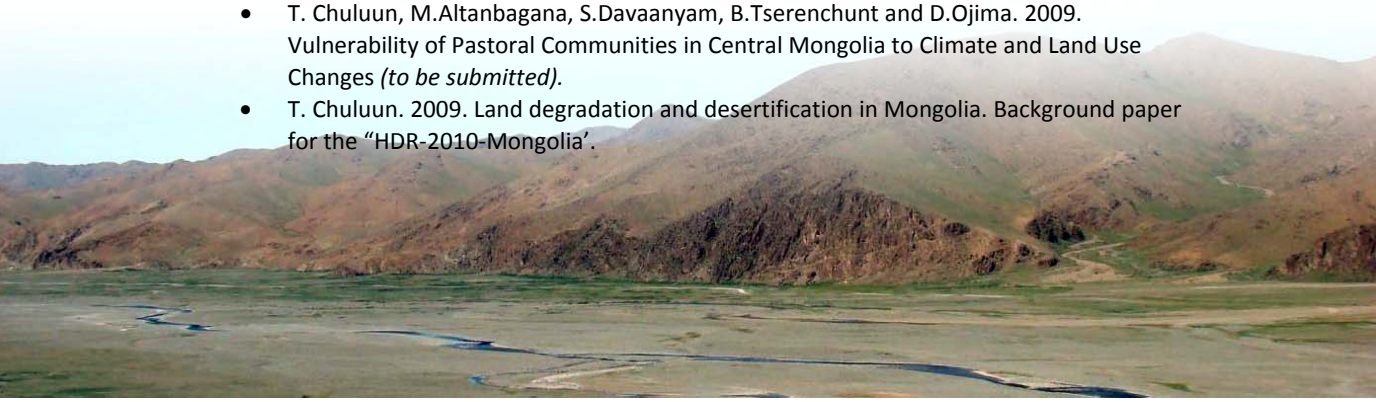
**APN Funding:** US$30,000 (For 1 Year)
(Year 2 expected funding is US$30,700)

**Project Summary:**
Combined effects of global warming and land-use changes have resulted in dramatic reduction of water and forage resources, leaving many herders in extremely vulnerable conditions as desertification is already occurring in this area. The herders are not fully aware that interactive climatic and human forces are leading to catastrophic consequences. Poverty and vulnerability reduction, and traditional resilience are critical for adaptive sustainability of pastoral social-ecological systems. The project goal is to improve adaptive capacity to climate change for pastoral communities living in the Southern Khangai Mountains and to make the DDP-based policy recommendation.

This study initially focussed in the Tuin River basin. During its first year, the project provided scientific knowledge on climate change, its impact on rangeland ecosystems, sustainable land-use, resilience reduction with land fragmentation in arid and semi-arid lands, and research findings in a suitable format for policy-makers and resource users.

**Publications:**

- T. Chuluun, M.Altanbagana, S.Davaanyam, B.Tserenchunt and D.Ojima. 2009. Vulnerability of Pastoral Communities in Central Mongolia to Climate and Land Use Changes *(to be submitted).*
- T. Chuluun. 2009. Land degradation and desertification in Mongolia. Background paper for the "HDR-2010-Mongolia'.



# 2.12 CRP2009-01NMY-Weber

## Vulnerability Mapping as a Policy Tool in Developing Countries

**Project Leader:** Dr. Eberhard Weber
Division of Geography, Marine Campus
The University of the South Pacific
FIJI
Tel: +67 9 323 2222
Fax: +67 9 323 1558
Email: Weber_e@usp.ac.fj

**APN Funding:** US$50,000 (For 1 Year)
(Year 2 expected funding is US$70,000)

**Project Summary**

This project is one of the two Comprehensive Research Projects (CRP) funded under the CAPaBLE programme's third phase. It investigates the vulnerability of people related to climate change. It focuses on people's vulnerabilities, the ways they sustain their livelihoods and how they cope with/adapt to adverse events.

Relevant indicators are being developed and used to map spatial distribution of vulnerability with an emphasis on providing spatial information needed by governments and non-governmental organisations (NGOs) as a basis for informed-planning and decision-making with the purpose to predict, prevent and mitigate negative results of climate change.

A key to a better understanding of negative impacts and for managing vulnerability lies in knowing the spatial distribution of vulnerable people as well as how hazards affect space. Mapping vulnerability looks into both aspects: 1) Where are the most vulnerable people; and 2) How do hazards impact space differentially (and thus people who live there). The ultimate purpose of the present project is to develop a comprehensive tool to learn: who are the people at risk; how many are they; where (and where not) do they live; why are they vulnerable; and how can interventions make a difference in reducing vulnerability, strengthening resilience and supporting sustainable livelihoods?

# 2.13 CRP2009-02NMY-Pereira

## Strengthening Capacity for Policy Research on Mainstreaming Adaptation to Climate Change in Agriculture and Water Sectors

**Project Leader:** Dr. Joy Jacqueline Pereira
Institute for Environment and Development,
Universiti Kebangsaan Malaysia (LESTARI-UKM)
MALAYSIA
Tel: +6 38 921 4149
Fax: +6 38 925 5104
Email: joy@ukm.my

**APN Funding:** US$70,000 (For 1 Year)
(Year 2 expected funding is US$95,000)

**Project Summary:**
Analysis of policies in selected countries revealed that important decisions in the agriculture and water sectors are implemented without considering projected impacts of climate change. One of the most important barriers identified was the limited capacity of researchers in the region to provide adaptation policy-relevant information. For example, research on indicators for monitoring the effectiveness of adaptation options at different spatial scales is completely lacking. Networking and communication among researchers and policy-makers focusing on adaptation is also extremely limited.

This project was initiated in August 2009 by LESTARI-UKM, in collaboration with the Institute for Global Environmental Strategies (IGES), Japan, M.S. Swaminathan Research Foundation (MSSRF), India, and Institute of Meteorology, Hydrology and Environment (IMHEN), Viet Nam. It aims to strengthen research capacity on mainstreaming climate change adaptation concerns into agricultural and water policies and to create a network for adaptation policy research in Asia.

The project adopts a three-pronged approach to strengthen research capacity on adaptation in the agriculture and water sectors: 1) Identification of practical options for mainstreaming and metrics for monitoring the effectiveness of adaptation policies and measures; 2) Exchange of adaptation policy-relevant information through creation of a network called ARPNAP (Adaptation Research and Policy Network for Asia and the Pacific); and 3) Dissemination of outputs beyond the project boundaries.

**Project Website:** http://pkukmweb.ukm.my/~apn/

## UPDATED PROJECT LEADER CONTACT INFORMATION

Should the contact information of any of the Project Leaders listed in this publication have changed, please kindly fill out the form below and return it by fax or email to:


The APN Secretariat
East Building 4F
1-5-2 Wakinohama Kaigan Dori
Chuo-ku, Kobe 651-0073
JAPAN
Tel: +81 078 230 8017
Fax: +81 078 230 8018
Email: info@apn-gcr.org


<table>
<tr><th colspan="3">Contact Details</th></tr>
<tr><td colspan="2">Full Name (write LAST NAME in CAPS)</td><td>Title (select as appropriate)<br>☐ Dr. ☐ Prof.<br>☐ Mr. ☐ Mrs. ☐ Ms.<br>☐ Other _____</td></tr>
<tr><td colspan="3">Qualifications/Specialty</td></tr>
<tr><td colspan="3">Specific areas of interest relating to Global Environmental Change</td></tr>
<tr><td colspan="2">Name of Organisation</td><td>Designation/Position</td></tr>
<tr><td colspan="3">Type of Organisation: ☐ Government Agencies ☐ Educational Institutions ☐ NGOs/NPOs ☐ Private Foundations ☐ Professional Societies ☐ Others</td></tr>
<tr><td colspan="2" rowspan="2">Business Address</td><td>Postal Code</td></tr>
<tr><td>Country (in CAPS)</td></tr>
<tr><td>Telephone</td><td colspan="2">Facsimile</td></tr>
<tr><td>Email</td><td colspan="2">Website</td></tr>
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http://www.apn-gcr.org/en/downloads/blankform_apndirectory.pdf

**The APN Secretariat**
East Building 4F, 1-5-2 Wakinohama Kaigan Dori, Chuo-ku, Kobe 651-0073 JAPAN
TEL: +81-78-230-8017; FAX: +81-78-230-8018
Email: *info@apn-gcr.org*; Website: *http://www.apn-gcr.org*