

PROGRAMME

SEAGA 2014



Geography
that matters:
unraveling
the destiny for
environment,
society and people in
Asia

25 - 28 Nov 2014

Siem Reap, Cambodia

co-organised by
Royal University of Phnom Penh
and
Southeast Asian Geography Association

Our sincerest thanks to our host,
partners and sponsors.



**Royal University of
Phnom Penh**



**Humanities and
Social Studies
Education
Academic Group**



ELSEVIER and



Our deepest gratitude goes to all student-helpers and
organisations that have supported
delegates to be at this event.

Conference information and online proceedings
will be hosted on
<http://www.seaga.info/>





Contents

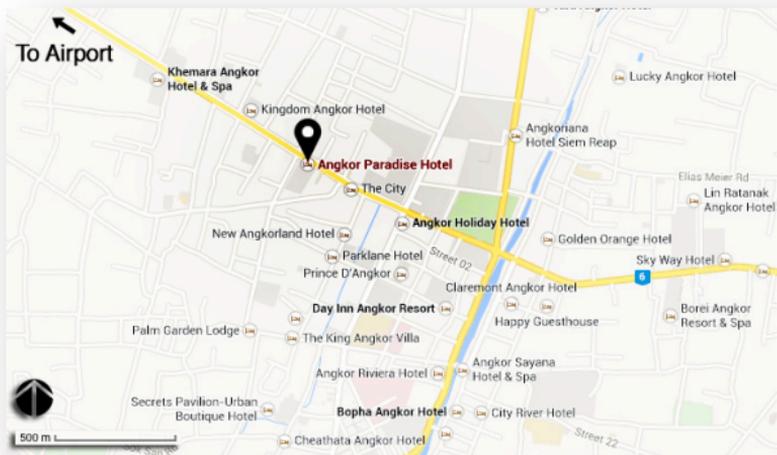
Contents	3
General Information	4
Organising Committee	4
Map of Main Venue	4
Venues for Sessions	5
Message	6
Message	7
Programme for Day 1	9
Programme for Day 2	13
Programme for Day 3	18
Programme for Day 4	18
Keynote & Plenary Addresses	21
Abstracts for Open Paper Sessions	23
Index of Authors	69

General Information

Organising Committee

Co-Chairpersons	Chea Eilyan Kok Sothea
Programme	Chew-Hung Chang Chea Eilyan Diganta Das Ivy Tan Kalyani Chatterjea Kim Irvine Kok Sothea Tricia Seow Bing Sheng Wu

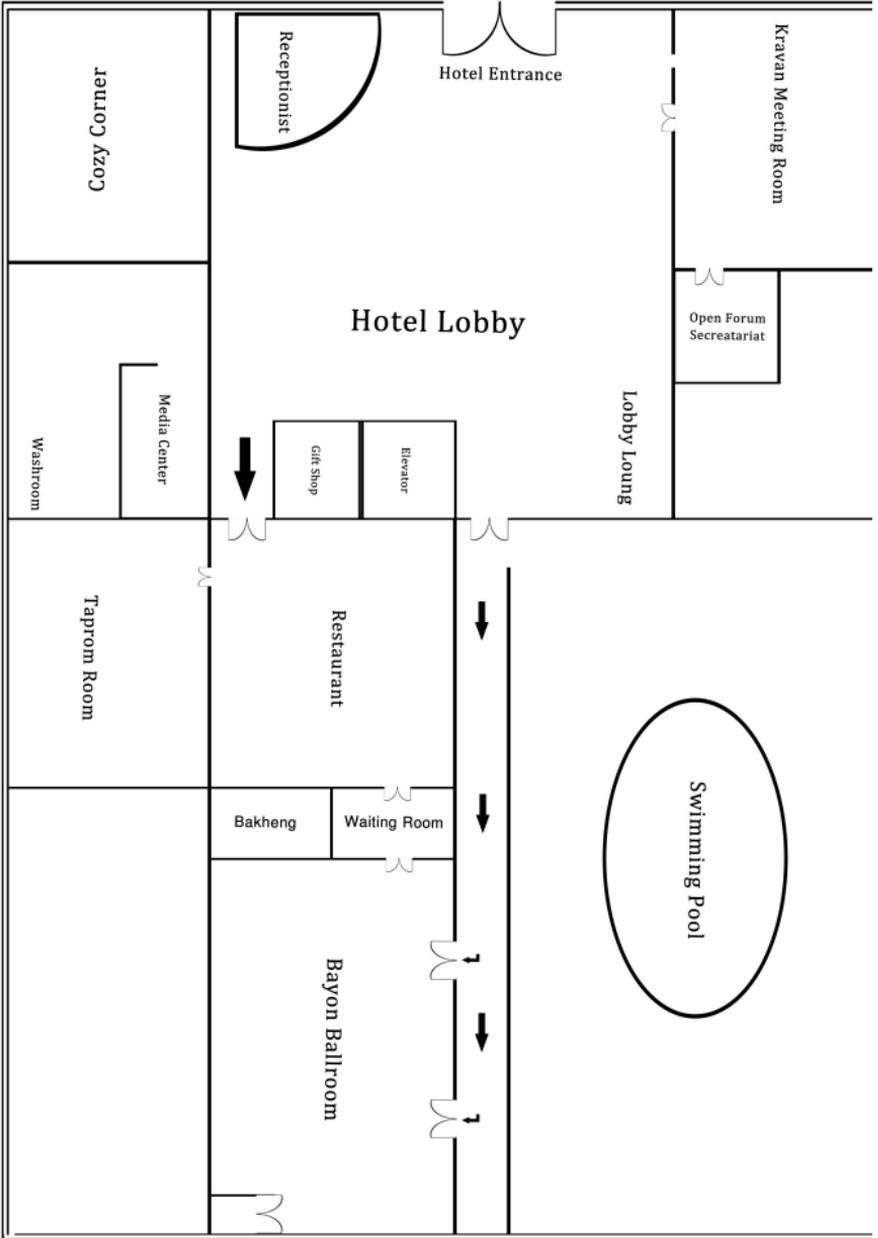
Map of main venue



Angkor Paradise Hotel
Phum Sala Kanseng, Sangkat Svay Dangkoum
National Route 6 (Airport Road)
Krong Siem Reap 17000, Cambodia

Venues for sessions

- Bayon Ballroom – ground floor
- Karavan Meeting Room – ground floor
- Bakhaeng Room – ground floor
- Taproom Room – ground floor (inside restaurant)
- Kulen Room – level 2 (Spa Building)



Message

The Southeast Asian Geography Association (SEAGA) Conference 2014 is the 12th biennial conference held since the association was established in 1990. The conference theme is “Geography that matters: unraveling the destiny for environment, society and people in Asia”. With more than 90 speakers at this year’s conference, multidimensional perspectives of issues in Southeast Asia will be presented by scholars, policymakers, non-government organizations, members of civil society, private enterprises and educators. With 3 keynote addresses, 2 plenary sessions, more than 25 concurrent panels and one field trip to the Angkor temples we have a full and exciting four-day programme. The aim of the conference is to advance the discourse on the issues of environment, society and people in Asia, so as to inform the decision-making and actions of society, private enterprises, and governments. Over the next few days, we will visit the key geographical themes of space, place, time, and human-environment relationships, covering topics on heritage, development, food production, transport, tourism, climate change, coasts, forests, water resources, and new frontiers in geographical education, just to name a few. These topics represent the diversity and complexity of geographical issues that cannot be overemphasised.

Southeast Asia is a unique region. With its diversity of economic and political systems, languages, religions, physical environments and cultures, there is much that we can learn from each other. We also are encouraged this year by the number of participants from outside the region. We need to work together both as the ASEAN and as a global community to unravel these issues in Southeast Asia, with a view to create a better future for people in the region. In line with SEAGA’s mission of promoting scholarship in Geography in the region, the opportunities created at the previous meetings have resulted in the formation of networks, writing and mentoring workshops, book projects, and special issues in scholarly journals. I encourage you to continue the discussions that will result in even more productive outcomes. It is for this very reason that many have come back to this intimate meeting of minds on a biennial basis.

Last but not least, I would like to thank our Cambodian hosts for their unwavering support throughout the whole event planning and organising process. On behalf of SEAGA, I would also like to thank Elsevier, our sponsor and all agencies that have supported the attendance of conference delegates in one way or another. Special thanks should also go to all who have helped and supported the conference series all these years. Welcome to the conference and the networks based on research and debate that SEAGA looks forward to building with you. I wish you a productive and enjoyable meeting.

Associate Professor Chew-Hung Chang
President
Southeast Asian Geography Association

Message

Welcome to Cambodia, Kingdom of Wonder!

The Royal University of Phnom Penh (RUPP) is honored and delighted to host this 12th SEAGA International Conference 2014 which will be held from 25-28 November 2014, Siem Reap, Cambodia.

RUPP is Cambodia's oldest and one of the largest public universities officially founded in 1960 and it became a full member of the ASEAN University Network (AUN) in 1999. RUPP offers undergraduate, graduate and professional programs in science, engineering, technology, social science and languages.

RUPP is in the process of transforming into Cambodia's flagship university and will continue to be the leading higher education institute in Cambodia, focusing on excellence in teaching and learning, committed to research for the development of the country and making a contribution to Cambodian society.

RUPP has a strong international focus in capacity building through research and development as well as hosting many academic events.

It is a hope that this conference will serve as a platform for researchers, scientists, policy makers and observers to share their experiences and knowledge in addressing sustainable development in the region as well as to network people who have keen interests in geography.

We are looking forward to welcoming you in Cambodia!

Suos Man
Vice Rector
Royal University of Phnom Penh



Programme Overview

Day 1: 25 Nov 2014

0800 - 0900	Registration
0900 - 1000	Welcome and Opening Address
1000 - 1030	Tea
1030 - 1145	Keynote Session 1 The Ooi Giok Ling Keynote Lecture
1145 - 1300	Lunch
1300 - 1430	Concurrent Session 1
1430 - 1600	Concurrent Session 2
1600 - 1630	Tea
1630 - 1800	Political Geography Plenary Lecture
1800 - 2000	Conference Dinner

Day 2: 26 Nov 2014

0845 - 1000	Keynote Session 2
1000 - 1030	Tea
1030 - 1200	Concurrent Session 3
1200 - 1300	Lunch
1300 - 1430	Concurrent Session 4
1430 - 1530	Tea
1530 - 1700	Concurrent Session 5

Day 3: 27 Nov 2014

Fieldtrips

Day 4: 28 Nov 2014

0845 - 1000	Keynote Session 3
1000 - 1030	Tea
1030 - 1200	Concurrent Session 6
1200 - 1300	Lunch
1300 - 1430	Concurrent Session 7
1430 - 1530	Closing Plenary
1530 - 1600	Closing Ceremony
1600 - 1630	Tea & Networking



Programme for Day 1

25 November 2014

0800 - 0845	Registration
0845 - 0900	All delegates and guests to be seated
0900 - 1000	<p>Welcome Address: A Prof Chew-Hung Chang, President, SEAGA</p> <p>Opening Address: Mrs. Suos Man, Vice Rector, Royal University of Phnom Penh</p> <p>Venue: Bayon Ballroom</p>
1000 – 1030	Tea
1030 - 1145	<p>Keynote Address 1: The Ooi Giok Ling Keynote Lecture The poverty of sustainable development in Southeast Asia: economic growth, the environment and people's lives</p> <p>Prof Jonathan Rigg Professor of Geography, National University of Singapore</p> <p>Session Chair: A Prof Chew-Hung Chang Venue: Bayon Ballroom</p>
1145 – 1300	Lunch
1300 – 1420	<p>Concurrent Session 1:</p> <p>CS1-a Special Panel on the Geography of Urban Climate Change in Southeast Asia: Science and Impacts</p> <p>Venue: Bayon Ballroom</p> <ul style="list-style-type: none"> • Geography's importance in past, present and future of tropical urban climatology by Winston Chow • A study of urban heat island using "Local Climate Zones": the case of Singapore by Yvonne X.Y. Ng • Impact of climate and urban changes on health risk: presentation of a research methodology on the spread of dengue in Phnom Penh and Can Tho by Julie Blot, Celine Pierdet, Christophe Cambier, Alexis Drogoul, Jean-Daniel Zucker, Nicolas Marilleau, Olivier Sevin, Frédérick Gay and Bernard Cazelles <p>Session Chair: Winston Chow</p>

1300 – 1420

CS1-b Identity, Community and Heritage**Venue: Karavan Meeting Room**

- ‘Little India’: diverging destinies in heritage spaces by **Rahil Ismail and Brian Shaw**
- “A right to rebel”: subaltern community barricades and demolitions in Sitio San Roque, Metro Manila by **Chester Antonino Arcilla**
- The art of not being governed: the geographies and identities of street frequenting children in Siem Reap, Cambodia by **Amanda Miller and Harriot Beazley**

Session Chair: **Rahil Ismail****CS1-c Issues in Cities I****Venue: Taproom Room**

- The 'Singapore model' in Southeast Asian cities by **Choon Piew Pow**
- Governing the megacity: the case of Manila by **Yves Boquet**
- Spatial changes of socio-economic Melbourne Metropolitan area from 2001 to 2011: compactness versus sprawl by **Mohammad R. Rahnama**

Session Chair: **Choon Piew Pow****CS1-d Geography, Environment and Education I****Venue: Kulen Room**

- Geography field expeditions at the National University of Singapore: student expectations, experiential learning and achievements in Fiji and Cambodia by **James Terry and Carl Grundy-Warr**
- Development of an App to analyse and visualise water quality data: use of mobile technology to enhance student experience in field investigations by **Vernon Tan**
- The experience of undergraduate students in Geography fieldwork: a revisit/reappraisal by **Enrico Garcia and Mark Alvin Cruz**

Session Chair: **Carl Grundy-Warr**



1430 - 1600

Concurrent Session 2:**CS2-a Journal Publishing in Human Geography: A Roundtable with Editors and Publisher on Tips, Pitfalls and Politics**Venue: **Bayon Ballroom**

Journal publishing in Human Geography: a roundtable with editors and publisher on tips, pitfalls and politics by *Kay McArdle, Harvey Neo and James Sidaway*

Session Chair: **James Sidaway****CS2-b Special Panel on Agrarian Change and Rural Development in Southeast Asia I**Venue: **Karavan Meeting Room**

- Taming the border landscape: Chinese diaspora and the politics of cross-regional transfer of agricultural technology at Northern Thailand by *Po-Yi Hung and Chunyi Hsu*
- Trajectories of commercial cassava farming in Cambodia by *Sothorn Kem and Rob Cramb*
- Fragmented territories: land formalizations and the transformations of agrarian systems in North-west Cambodia by *Jean-Christophe Diepart and Thol Sem*

Session Chair: **Jonathan Rigg****CS2-c Environmental Challenges in Southeast Asia I**Venue: **Taproom Meeting Room**

- Environmental gradients at the altered forest edge: Bukit Timah Nature Reserve, Singapore by *Kalyani Chatterjea*
- Detecting the changes of shoreline and riverbank for Tien River in area of Dong Thap Province, Mekong Delta from remotely sensed data by *Hung Pham, Hoanh Trinh and Minh La*
- Rural solid waste management: a preliminary study on waste management practice by rural residents in Kuala Penyu, Sabah, Malaysia by *Mohammad Tahir Mapa, Kntayya Mariappan, Moreen De Silva, Paul Porodong, Diana Peters, Maine Suadik and Gaim Lungkapis*

Session Chair: **Kalyani Chatterjea**

1430 - 1600	<p>CS2-d Sustainability and Development</p> <p>Venue: Kulen Room</p> <ul style="list-style-type: none"> • Malaysia's pathway towards sustainable development targets: timeline, strategies and challenges by <i>Noranida Mokthsim and Khairulmaini Osman Salleh</i> • Development of tourist facilities due to the status transition of village into tourism village: a case study in Gubugklakah Village, Malang, Indonesia by <i>Adelina Chandra, Diah Rossy Pratiwi and Noer Sulistyarini</i> • Suitability analysis of economic share and employment share on ASEAN member countries based on main sector industries toward ASEAN economic community (AEC) by <i>Warastri Laksmiasri, Nur Wiryanti Sih Antomo and Latifatul Khoiriyah</i> • Vietnam, an opening under control: Lao Cai on the Kunming-Haiphong economic corridor by <i>Marie Mellac</i> <p>Session Chair: Kim Irvine</p>
1600 – 1630	Tea
1630 – 1800	<p>Political Geography Plenary Lecture</p> <p>The shifting geopolitics of the Mekong</p> <p>Prof Philip Hirsch Professor of Human Geography Director, Mekong Research Group (AMRC) School of Geosciences The University of Sydney</p> <p>Session Chair: Prof James Sidaway Discussants: Dr Karin Dean, Dr Carl Grundy-Warr, Dr Mak Sithirith, Dr. Thomas Ptak</p> <p>Venue: Bayon Ballroom</p>
1800 – 2000	Conference Dinner
2000	End of Day 1

Programme for Day 2

26 November 2014

0800 – 0845	Registration
0845 - 1000	<p>Keynote Address 2:</p> <p>New Cultural Shift in Teaching and Learning School Geography to Meet the C21st Aims of Education</p> <p>A Prof Tammy Kwan Assistant Dean (School-University Partnerships), The University of Hong Kong</p> <p>Session Chair: A Prof Ivy Tan Venue: Bayon Ballroom</p>
1000 - 1030	Tea
1030 – 1200	<p>Concurrent Session 3:</p> <p>CS3-a Special Panel on International Volunteerism and Development in Asia-Pacific I</p> <p>Venue: Bayon Ballroom</p> <ul style="list-style-type: none"> • The Other in close quarters: volunteers for migrant worker NGOs in Singapore by <i>Sallie Yea</i> • International Development Volunteering from Singapore to Cambodia: how relationships impact development by <i>Jinwen Chen</i> • Transcendence and potential: the volunteer-host encounter and embodied development imaginaries by <i>Mark Griffiths</i> • Child emotional labour in Cambodian orphanage tourism by <i>Tess Guiney</i> <p>Session Chair: Harnng Luh Sin</p> <p>CS3-b Spec Panel: Dams on the Mekong River's Tributaries</p> <p>Venue: Bakhaeng Room</p> <ul style="list-style-type: none"> • Session overview of the Special Panel by <i>Mak Sithirith</i> • Dams on the Mekong tributaries: strengthening transboundary cooperation in the context of climate change by <i>Yong Jiang and Jaap Evers</i> • Impacts of reservoirs operation on hydrological regime in the Sesan River Basin by <i>Le An Ngo and Ilyas Masih</i> • Assessing the impacts of hydropower development and climate change on rural livelihood and biodiversity in the Sesan and Srepok catchment, Cambodia by <i>Seak Saphat</i> <p>Session Chair: Mak Sithirith</p>



1030 – 1200	<p>CS3-c GIS & Remote Sensing</p> <p>Venue: Taproom Room</p> <ul style="list-style-type: none"> • Traffic and urban noise: quantitative analyses of soundscape in Taipei City, Taiwan by Bing Sheng Wu • Composition of spectral and ancillary data in land cover classification: a case study in Hoa Binh- Vietnam by <i>Thuy Hanh Nguyen Thi and Dien Tran Ngoc</i> • GIS application for blood donor active mapping in Yogyakarta City by <i>Gerry Utama, Bernadetta Alnybera Febrianningsih and Ratri Marifatun Nisaa</i> • Using Open Source Web-Based GIS for publishing and querying cadastral information in Long Xuyen City, An Giang Province, Vietnam by <i>Hung Pham</i> <p>Session Chair: Bing Sheng Wu</p> <p>CS3-d Geography, Environment and Education II</p> <p>Venue: Kulen Room</p> <ul style="list-style-type: none"> • Sustainable development and climate change: response for education by Kim Chuan Goh • Sustainable development education in Malaysian school: greenery or behavioural changes by <i>Hanifah Mahat, Mohamad Suhaily Yusri Che Ngah, Shaharuddin Ahmad and Noraziah Ali</i> • Influence of school environment on the academic performance of pupils by <i>Raphael Odelola</i> • English education industry and regional employment in Western Visayas, Philippines by <i>Jingu Kang</i> <p>Session Chair: Kim Chuan Goh</p>
1200 – 1300	Lunch
1300 – 1430	<p>Concurrent Session 4:</p> <p>CS4-a Special Panel on International Volunteerism and Development in Asia-Pacific II - Roundtable</p> <p>Special expert discussion panel on international volunteerism and development in Southeast Asia by Sallie Yea and <i>Harnng Luh Sin</i></p> <p>Venue: Bayon Ballroom</p> <p>Session Chair: Sallie Yea</p>

1300 – 1430

CS4-b Special Panel on Agrarian Change and Rural Development in Southeast Asia IIVenue: **Bakhaeng Room**

- Java: coping with high population densities by *Rodolphe De Koninck*
- ‘Taking research to scale’: linking local agricultural interventions with scale theory by *Liana Williams, Rob Cramb and Clemens Grünbühel*
- Rural people in an urban tourism boom by *Robin Biddulph*

Session Chair: **Jonathan Rigg****CS4-c Rivers in Southeast Asia: Issues and Challenges**Venue: **Taproom Room**

- Assessing sediment flux change and corresponding agro-economic impact on the Mekong Delta due to mainstream dams in the Mekong River using an Integrated System Dynamics by *Sooyoun Lee and Soojin Park*
- Risk perception and adaptation strategy in 3S Rivers of Cambodia by *Kesa Ly*
- Multi-scale flood vulnerability assessment of agricultural production in a context of environmental change: the case of Sangkae River watershed, Battambang Province, Cambodia by *Sotheavin Doch, Chinda Heng and Jean-Christophe Diepart*

Session Chair: **Kim Irvine****CS4-d Climate Change Discourses**Venue: **Kulen Room**

- You don’t know what you don’t know: Singaporean youth’s misconceptions about climate change by *Chew-Hung Chang and Liberty Pascua*
- Adaptive capacity to flood of communities in North Central Vietnam: case studies in Yen Ho commune, Duc Tho district, Ha Tinh province and Hung Nhan commune, Hung Nguyen district, Nghe An province by *Phuong-Thao Nguyen, Thi-Ha-Thanh Nguyen and Quang-Huy Man*
- A preliminary study on the implication of changing climate on food security: a case study in Kota Belud, Sabah by *Abdul Razzaq Bakri, Ramzah Dambul and Yasmin Ooi Beng Houi*
- Farmers’ perception of climate change in semi arid zone: a case study in XinJian and Zhangga Villages, XunHua County, Qinghai Province, People’s Republic of China by *Firuz M, Ibrahim Nather Khan, Ma Fu, Zhang Ming Ming, Huang Juncheng Juncheng, Xu Jianlong Jianlong, Ma Yuzhen Yuzhen, Zhang Shihua and Wu Qian Qian*

Session Chair: **Liberty Pascua**

1430 - 1530

Tea

1530 – 1700

Concurrent Session 5:**CS5-a Geographies of Agriculture**Venue: **Bayon Ballroom**

- A comparison of rubber smallholder livelihoods in Cambodia and Laos by *Edo Andriesse*
- Conservation enclosure and the rise of the rubber boom: adopting rubber cultivation to upland Thailand by *Autsadawut Mongkolkaew*
- Value chains and the Middle Income Trap: the case of the sugar industry in Northeastern Thailand by *Dennis Choi and Edo Andriesse*

Session Chair: **Edo Andriesse****CS5-b Natural Hazards**Venue: **Bakhaeng Room**

- A proposed evacuation plan/map for residents at Barangay 843 – Zone 92 in Pandacan, Manila in case of geohazard episodes by *Timothy James Cipriano and Enrico Garcia*
- Agricultural impact of cold lahar flood of Kelud Volcano Eruption in 2014: a case study in Konto Watershed, Ngantang, Malang by *Adelina Chandra, Diah Rossy Pratiwi and Noer Sulistyarini*
- Flood inundation mapping: a case study of Jakarta flood by *Kuswanto Marko, Eko Kusratmoko and Amro M. Elfeki*

Session Chair: **Kalyani Chatterjea****CS5-c Geography, Environment and Education III**Venue: **Taproom Room**

- “Wicked” problems in teaching geography: Singapore teachers’ perspectives of climate change education by *Tricia Seow and Li-Ching Ho*
- Survey of environmental knowledge, attitudes and behaviour of students and student teachers in Singapore by *Ivy Tan and Qiu Fen Jade Chen*
- Different strokes for different folks: a critical commentary from the viewpoint of a teacher advocating differentiated instruction when conducting Geographical Investigation by *Frances Ess*
- Engaging in disaster education: building disaster literacy and preparedness in the Philippines by *Hiroko Nagai*

Session Chair: **Tricia Seow**

1530 – 1700	<p>CS5-d Environmental Challenges in Southeast Asia II</p> <p>Venue: Kulen Room</p> <ul style="list-style-type: none">• From Dipterocarpus forest to rubber plantation by <i>Sekson Yongvanit</i>• Geographic Information Systems application to estimate the level for flood vulnerability around Code River, Yogyakarta City by <i>Janu Muhammad</i>• Mapping of the reduction of active sand dunes area as natural heritage in Parangtritis Coast, Yogyakarta by <i>Isna Pujiastuti, Fithrothul Khikmah, Galih Dwi Jayanto and Muh Aris Marfai</i> <p>Session Chair: Sekson Yongvanit</p>
1700	End of Day 2



Programme for Day 3

27 November 2014

0800 – 1800	Field visit to the Angkor Wat, Angkor Thom and Ta Prohm
-------------	---

Programme for Day 4

28 November 2014

0845 - 1000	<p>Keynote Address 3:</p> <p>Wetlands, Field Studies and Ecology: From Curiosity to Epistemology</p> <p>Prof Dhrubajyoti Ghosh Regional Chair for South-Asia, Commission on Ecosystem Management, International Union for Conservation of Nature (IUCN)</p> <p>Session Chair: As Prof Diganta Das Venue: Bayon Ballroom</p>
1000 – 1030	Tea
1030 – 1200	<p>Concurrent Session 6:</p> <p>CS6-a Special Panel: Sustainably Managing Water Resources in an Urbanizing World Venue: Bayon Ballroom</p> <ul style="list-style-type: none"> Hydrological resilience in a climate changing world: a case study of the extremes in Singapore by <i>Kim Irvine and Chew Hung Chang</i> Impacts of urban wastewater on water quality of a lake at Rach Gia Bay in the Mekong Delta, Vietnam by <i>Long Trinh Thi, Chuong Dang Minh, Vinh Pham The and Chinh Duong Cong</i> Worlding Hyderabad and its liveability and sustainability challenges by <i>Diganta Das</i> East Calcutta Wetlands: introducing new areas of learning by <i>Dhrubajyoti Ghosh</i> <p>Session Chair: Kim Irvine</p> <p>CS6-b Issues in Food Production I Venue: Bakhaeng Room</p> <ul style="list-style-type: none"> Weighing costs, weathering risks: adaptive strategies of fish farmers facing multiple risks in Northern Thailand by <i>Santita Ganjanapan</i> Fish farmers' utilization of social networks to adapt to drought and water pollution in upper Northern Thailand by <i>Weerakan Kengkaj</i> Fish-farming household burdens, mobility decisions and multiple vulnerability reduction in the Ping River Basin, Thailand by <i>Phaothai Sin-Ampol</i> <p>Session Chair: Tricia Seow</p>



	<p>CS6-c Issues in Cities II</p> <p>Venue: Taproom Room</p> <ul style="list-style-type: none"> • Jabodetabek Metropolitan Council: an alternative institutional arrangement by <i>Triarko Nurlambang</i> • Land degradation potential and landing zone function in Subdistrict Sumbermanjing Wetan, Malang, Indonesia by <i>Agung Hermawanto</i> • Health issues among scavengers: preliminary study on Kayu Madang landfill site, Kota Kinabalu, Sabah, Malaysia by <i>Abdul Hair Beddu Asis and Muhammad Tahir Mapa</i> <p>Session Chair: Ivy Tan</p>
1200 – 1300	Lunch
1300 – 1430	<p>Concurrent Session 7:</p> <p>CS7-a Is Tourism The Way To Go? Teachers' Roundtable</p> <p>Venue: Bayon Ballroom</p> <p>Teachers' field inquiry on Tourism in Siem Reap by <i>Chew-Hung Chang & Tricia Seow</i></p> <p>Session Chair: Tricia Seow</p> <p>CS7-b Issues in Food Production II</p> <p>Venue: Bakhaeng Room</p> <ul style="list-style-type: none"> • The Singaporean aquaculture industry: swimming against the tide? by <i>Guanie Lim</i> • Identification of rural transition using changing agriculture area in Kuta Utara, Badung, Bali by <i>Fithrothul Khikmah, Galih Dwi Jayanto, Isna Pujiastuti and Joko Christanto</i> • Distribution of agricultural damage due to Mount Kelud Eruption in Pujon District, Malang, East Java by <i>Desy Puspita, Fathiyya Ulfa and Fadiah Adlina Ulfah</i> <p>Session Chair: Diganta Das</p> <p>CS7-c Inclusive Geographies: Whose Space Is It?</p> <p>Venue: Taproom Room</p> <ul style="list-style-type: none"> • Minorities and diversity for sustainable social development by <i>Walter Leimgruber</i> • Marginal societies and change: a study of the Orang Asli communities of peninsular Malaysia by <i>Sitiqhairunissa Ramli</i> • Typologizing the Kachin contemporary mobilities by <i>Karin Dean</i> • The Trans-political Nature of Southwest China's Energy Conduit, Yunnan Province by <i>Thomas Ptak</i> <p>Session Chair: Sallie Yea</p>



1300 - 1430	<p>CS7-d Issues in Southeast Asia</p> <p>Venue: Kulen Room</p> <ul style="list-style-type: none"> • Quantification of Drilling-Induced Contamination in Arsenic Prone Well Waters in Kandal Province, Cambodia by <i>Laura Richards, Daniel Magnone, Bart van Dongen, Christopher Ballentine and David Polya</i> • Education and Religious Institution as Agents of Change, a Community Social Capital of Disaster Prone, a case study in Magepanda Village, Sikka District, Nusa Tenggara Timur Province, Indonesia by <i>Widyawati Sumadio</i> • Vulnerability Assessment of the Impact of Urban Heat Islands: A Comparative Study Of Bandar Lampung And Jakarta Metropolitan Area by <i>Tumiar Katarina Manik and Syarifah Syaukat</i> <p>•</p> <p>Session Chair: Kim Irvine</p>
1430 – 1530	<p>Closing plenary:</p> <p>Geography that matters: unraveling the destiny for environment, society and people in Asia</p> <p>Panel discussants: Prof Jonathan Rigg Prof Dhrubajyoti Ghosh Ms Chea Eliyan A Prof Chew-Hung Chang</p> <p>Session Chair: A Prof Chew-Hung Chang Venue: Bayon Ballroom</p>
1530 – 1600	<p>Closing Ceremony</p> <p>Closing address by As Prof Bing Sheng Wu, Vice President, SEAGA</p> <p>Venue: Bayon Ballroom</p>
1600 – 1630	<p>Networking Tea</p>

Keynote & Plenary Addresses

The poverty of sustainable development in Southeast Asia: economic growth, the environment and people's lives

Jonathan Rigg

Professor of Geography

National University of Singapore

This keynote lecture returns to a well-rehearsed argument that liberal environmentalism has failed. Drawing on case studies from Cambodia, the Lao PDR and Vietnam, the lecture argues that buoyant economic growth and rising aggregate wealth has failed to mitigate Southeast Asia's twin development and environmental crises. Structural violence and social and spatial injustice have become emblematic of the region's development and environmental transitions. The speaker suggests that the reasons for this are four-fold: that the mode of growth in the region leaves little scope for socially and environmentally sound policies and practices; that the opportunities which globalisation has provided for the offshoring of environmental costs has shielded from view some of the processes underway; that governments still very largely adhere to a growth-at-(almost)-all-costs mentality; and that those groups and individuals suffering from resource extraction and environmental decline are poor, marginal, and have little power. Taken together and it is hard to be sanguine about the region's environmental prospects.

New cultural shift in teaching and learning school Geography to meet the C21st aims of education

Tammy Kwan

Assistant Dean (School-University Partnerships)

The University of Hong Kong

The process of globalisation has gone up to an escalating pace that traditional schooling can hardly be seen as fit to cope with such a demand on change. School curriculum has been undergoing transformation to meet with the global development in terms of the aims and intentions of education and its teaching and learning process. Every school subject has to reinvent its wheel in order to play a vital role in the whole process of educational reform in order to meet its expectations. I would like to share with you the salient features of today's geography classroom to show how it is set up to deliver the new school geography that will meet new aims of education and to show its unique and significant contribution. In doing so, there is a cultural shift in teaching and learning the school geography among teachers and students, to ensure the contribution of Geography can help to meet the challenges of the C21st educational scenario.

Wetlands, field studies and ecology: from curiosity to epistemology

Dhrubajyoti Ghosh

Special Advisor (Agricultural Ecosystems) and

Regional Chair for South-Asia

Commission on Ecosystem Management

International Union for Conservation of Nature

This keynote address refers to my field studies in the wetlands to the east of Kolkata, which started in 1981 (sporadically visited since 1981) and continued to date, with a gap of ten years from 2004 to 2013. What started as a curiosity

of an ecologist has continued as a task in the reassembling the theory and practice in ecology and ecosystem management.

I shall divide the address into three parts. These divisions however, are only for simplicity in narrating, and are no separate compartments of knowing. The period from 1983 to 1992 was predominantly a period of *ecological interpretation*. From 1993 to 2004, it was a period of *establishing the worldview* of the faceless fishers who found out that municipal wastewater is a pack of 'nutrients', rather than being termed as 'pollutants' in conventional sanitary engineering textbooks. It is for this globally recognised 'worldview' that the previously unknown wetlands to the east of Kolkata have become a Ramsar site - a wetland of international significance.

After a hiatus of ten years, I revisited the site in 2013 with an epistemological enquiry in mind, to engage the understandings of the wetland community, the construction and acquisition of their experiential knowledge in ecosystem management and the site's ecology. This work has just started and is opening up wide areas of policy research and subjective propositions.

The experiential knowledge of the wetland community is found to exist as a dynamic, self-organised and multi-dimensional formation. The complex and interrelated knowledge grew out of a specific background, as compulsions of livelihood and evolved skills. Their ecosystem activities alternate between 'reasoned' and 'arbitrary', and associated knowledge seems to alternate between 'definitive' and 'tentative'. The experiential knowledge of the wetland community reported here is invariably forming a part of the larger knowledge pool of wetland wise use, ecosystem management and ecology at the global level.

The shifting geopolitics of the Mekong: a multi-dimensional approach

Philip Hirsch

Professor of Human Geography

Director, Mekong Research Group (AMRC)

School of Geosciences

The University of Sydney

The Mekong is a region whose rapid economic development is bound up in a number of transboundary issues, which generate a complex regional geopolitics. The most obvious of these is the shared river basin whose main artery gives the region its name, and whose waters are shared by six countries. Flows of goods and people, infrastructure development and a host of environmental linkages also bind the countries of the Mekong into relationships that throw up new challenges, just as earlier tensions and conflicts recede. At the same time, the Mekong is situated within a wider regional and global politics that help position countries with respect to one another. The geopolitics of the region tend to be discussed and addressed in issue-specific ways – water, boundary disputes, people trafficking and so on. This paper seeks to explore the inter-relatedness of geopolitical agendas as multi-dimensional configurations, so that for example we need to understand politics around water and dams between lower Mekong countries in the context of China's rise and its meaning for the negotiating stances of smaller countries in the region. The paper employs several case studies to illustrate the shifting geopolitics and to suggest that multi-dimensionality is key to understanding the directions of such shifts.

Abstracts for Open Paper Sessions

Concurrent Session 1:

CS1-a Special Panel on the Geography of Urban Climate Change in Southeast Asia: Science and Impacts

Geography's importance in past, present and future of tropical urban climatology

by *Winston Chow*

Over the past several decades, the study of how the process of urbanisation affects weather and climate – and vice versa – has been taking precedence in published academic research. This is unsurprising given that more than half of the global population now resides in cities, with recent rates of urbanisation most apparent within tropical and sub-tropical climates. Furthermore, largely detrimental effects of global climate change – such as increasing weather extremes and sea-level rise – on populations may be magnified by local or regional alterations to climate from urban development in low latitude cities. In this presentation, the author will attempt to update on previous urban climatology research undertaken in tropical cities last summarised by Roth (2007), focusing on (sub-tropical-specific themes arising from a range of published studies; these include knowledge derived from (a.) understanding physical processes of urban climate phenomena; (b.) its biophysical impacts on urban populations, and (c.) the potential mitigation and adaptation measures applied to minimise urban exposure and risks. The author will also highlight the critical role that Geography can contribute towards increasingly inter-disciplinary aspects of urban climatology that require researchers to be cognisant of the methods and approaches utilised in various scientific and social scientific fields.

A study of urban heat island using “Local Climate Zones”: the case of Singapore

by *Yvonne X.Y. Ng*

The study of urban heat islands traditionally relies on simplistic descriptors such as “urban” and “rural”. While these descriptors may be evocative of the landscape, they are insufficient in providing information like its site properties, which have direct impacts on the surface-layer climate. The newly developed “Local Climate Zones” (LCZ) characterization scheme from Stewart and Oke (2012) was applied to three case study areas to provide a more objective assessment of the urban heat island (UHI) phenomenon in Singapore. The three step procedure of site metadata collection, definition of the thermal source area, and selection of the appropriate climate zone was followed for the three case study sites representing green space, a typical high rise residential housing area, and the CBD to identify and explain UHI characteristics. Characterization of the three study sites included scoring of sky view factor, canyon aspect ratio, terrain roughness, building surface fraction, impervious surface fraction, surface energy admittance, surface albedo, and anthropogenic heat flux based on observation, photography, and Google Earth imagery, to determine the LCZ class. Temperature, wind speed, and relative humidity were recorded on an hourly basis at each site.



using Kestrel 4000 weather trackers at a 2 m elevation for five consecutive days in January 2014. The three study sites were characterized as LCZ 1 (compact high rise (CBD)), LCZ 4 (open high rise (high rise residential housing area)), and LCZ 9 (sparsely built (green space)). The temperature for LCZ 9 was lower than the other two sites, with the greatest UHI intensity for mean air temperature being 2.01 °C between LCZ 4 and LCZ 9. Interestingly, although the CBD area was warmer than the open high-rise area between midnight and 6 a.m., a typical UHI phenomenon, the mean air temperature for the entire 5 day period was greater at the open high-rise site.

The lower temperature at the green space site emphasizes the importance of such spaces in the urban landscape as a means to make cities more liveable and resilient to climate change impacts. The higher mean temperature at the open high-rise site as compared to the CBD site was related to anthropogenic activities (particularly traffic patterns) landscaping/green space, and the influence of a large green certified building within the circle of influence at the CBD site. Overall, the use of LCZ in quantifying the UHI magnitude in Singapore was relatively straightforward to apply and this approach should be used more objectively to investigate the UHI phenomenon, particularly in tropical cities.

Impact of climate and urban changes on health risk: presentation of a research methodology on the spread of dengue in Phnom Penh and Can Tho

by *Julie Blot, Celine Pierdet, Christophe Cambier, Alexis Drogoul, Jean-Daniel Zucker, Nicolas Marilleau, Olivier Sevin, Frédérick Gay and Bernard Cazelles*

In a context of accelerated climate change, populations suffered from two major risks which are well-identified and probably related: the question of the access to drinking water on the one hand and epidemiological risk on the other hand with the recent resurgence of epidemic dengue waves. Phnom Penh and Can Tho are located in the Mekong delta Region and this presentation questions if there is a link between their specific forms of urban growth, their corresponding locations and the development of the two risks of access to drinking water and epidemic dengue waves? Different climatic and anthropogenic factors are probably responsible for the deterioration of the health situation in these cities. This talk will present the research hypotheses and a methodology of modeling in the form of complex systems, resulting from interactions between men, water and vectors, at different scales of time and space.

CS1-b Identity, Community and Heritage

'Little India': diverging destinies in heritage spaces

by *Rahil Ismail and Brian Shaw*

As a colonial legacy of the spatial and political management of immigrant groups, 'Little India' has evolved during Singapore's post-independence era to service the needs of a developing community. While closely identified as an 'Indian space' by Indian Singaporeans, it has developed significant appeal to other locals and foreign tourists, as well as migrant workers from South Asia. This area, 'showcasing' one component of Singapore's imagined CMIO community (Chinese Malay, Indian and Other), has since the tumultuous events of 8th December 2013, become the inadvertent focus of a much broader discussion on Singapore's national multicultural resilience in an era of hyper-globalisation. This paper considers and questions the apparent destiny of 'Little India' as one of



Singapore's most identifiable precincts in the context of post 8th December policing responses, the introduction of the new 'Public Order (Additional Temporary Measures) Bill' and the expected findings of the established Committee of Inquiry (COI). Overwhelmingly, the government's inclination to segment identity spaces within the heritage precinct as a means of social control and public order, specifically through the restriction of alcohol sales and consumption, appears to be a case of managing the 'visibility' of marginalised groups in order to contain evolving tensions. We argue that this path of action does not adequately address the complexity of underlying causes that cannot be simply dismissed as alcohol related. A more nuanced analysis with more emphasis on the economic and social realities confronting the South Asian foreign worker in Singapore is required to understand "The New Multiculturalism" now apparent in the city-state. Official bureaucratic demarcators of 'foreign worker', 'foreign talent' or 'PR' mask an inequity of social, economic and personal dignities and destinies that further fragment Singapore's carefully managed ethnic balance and social mosaic. We need to move beyond the "disciplining differences" of 1965 to embrace the Brave New World of contemporary reality.

"A Right to Rebel": subaltern community barricades and demolitions in Sitio San Roque, Metro Manila

by *Chester Antonino Arcilla*

From January 27 to January 31, 2014, despite courageous yet desperate barricade of some 200 activists that turned a street into a battle ground for a day, almost 400 urban poor families in Sitio San Roque in Metro Manila had their homes forcibly demolished by the more than 700 policemen and SWAT and 500-person demolition crew, leading to scores being injured and the arrest of 11 activists, including 2 minors. In this paper, I will discuss the experience and strategy of a 'barikadang bayan' (community barricade) and argue that the marginal inclusion in urban planning constrained the subaltern's response to confrontational politics that is often manifested as a community barricade against a violent demolition.

The recent and ongoing demolition in Sitio San Roque, is home to almost 15,000 urban poor Filipino families and is located on land owned by the government. The government is primarily tasked to provide housing for the poor, but this demolition was undertaken to make way for the Quezon City Central Business District, which is a multibillion-dollar development project under the Philippine public-private partnership program. I will first review the legal foundations of the demolition from presidential proclamations and World Bank recommendations for land use conversion, and discuss how the local government has followed this directive and incorporated into its city land use plan and implemented the land 'clearing' through zoning ordinances and the local housing board. I will then recount how subalterns were 'consulted' only at the instance of relocation, at the tail end of urban planning and implementation, and that in their struggle for their right to the city, their response was predisposed towards confrontational politics, characterized by distrust of state actors and legal procedures, and primary reliance on the difficult class mobilization of the urban poor for a community barricade. I will conclude by detailing procedures, difficulties and risks of a community barricade, and by bearing witness to the wretched experience of a state-sponsored violent demolition and to the enduring resilience of the urban subaltern. This paper is a result of key informant interviews, document analysis and ongoing urban ethnography.

The art of not being governed: the geographies and identities of street-frequenting children in Siem Reap, Cambodia

by *Amanda Miller and Harriot Beazley*

Street-frequenting children and youth in many countries in Southeast Asia are perceived by the State and mainstream society to be upsetting ideological constructions of citizenship, which is based on middle class values, and considered to be committing a 'transgressive act' by violating the moral boundaries of the ideal family, school and community (Cresswell, 1996). Children who work on the streets in Siem Reap, Cambodia are not conforming to the desired image of the 'ideal child' and their constant existence and mobility represents a menace to the success of the State, which is based on the sedentary lifestyles and on the view that the family structure is irreplaceable, and the nation is modern and 'developing'. As a result of this perceived transgression, the State and dominant groups, attempt to stigmatise, oppress and conceal undesirable children, and to limit the physical spaces in which they can operate.

CS1-c Issues in Cities I

The 'Singapore model' in Southeast Asian cities

by *Choon Piew Pow*

In the fast-paced world of urban policy-making, paradigmatic cities have been widely circulated as 'ready-made' urban models to be learned and emulated. In critical urban studies literature, these highly stylized urban models are, however criticized as 'one-size-fits-all' policy solutions. Rather than accepting the unproblematic transmission of supposedly 'best practices' from one city to another, critical urban scholars have argued that urban policy mobility and the accompanying city models are socially constructed processes that are deeply embedded in power relations and animated by urban imaginaries of 'good places' to live and work. In this context this paper seeks to unpack the so-called 'Singapore model' and critically examine how it has been assembled and exported. Both in rhetoric and built form, the purported Singapore urban model has been exported to many cities in the 'global south' and circulates through a series of urban policy imaginaries which found complex spatial expression. This paper will critically take stock on the travel of the 'Singapore model' of urban development in Southeast Asian cities.

Governing the megacity: the case of Manila

by *Yves Boquet*

The capital region of the Philippines is one of the largest urban areas in the world in terms of population. Metro Manila, in its official perimeter of 17 municipalities, is home to about 12 million people, and perimetropolitan expansion brings the real figure to 15 or 16 million inhabitants for the urban area. The rapid growth of the urban area since the 1960s has led to major management problems in the realms of housing, traffic, waste treatment and flood risk prevention, among others, these phenomena being interrelated.

Created by Ferdinand Marcos, the National Capital Region was first managed directly by his wife Imelda Marcos, Governor of Metro Manila. After the fall of the dictatorship, a strong push for more autonomy of the constituent municipalities has led to the strong powers given to local governments and especially mayors. MMDA, the government-controlled development

agency of the city of Manila, which is supposed to coordinate policy developments in the capital region, appears to be weak and unable to ensure harmonious growth of the city.

We will examine in this presentation some of the difficulties and obstacles encountered, before pondering the most appropriate level of management problems of everyday life from the barangay (district government) level to the municipalities, Metro Manila, Mega Manila and the whole Filipino nation. Should duties be delegated to one single layer of governance, tackled separately or in a multi-scale mix of geographic entities cooperating on issues in variable spatial settings?

Spatial changes of socio-economic Melbourne Metropolitan area from 2001 to 2011: compactness versus sprawl

by *Mohammad R. Rahnama*

The main objective of this article is to determine the relationship and spatial changes of the income, population, use the car to go to the workplace, employment and distance from the city center of Melbourne between 2001 and 2011. This paper presents the change of the mentioned variables through 78 statistical units (SU) based on the Australian Bureau of Statistics (ABS) using multiple, linear regression and Neural Network in Matlab and ArcGIS software. Results showed that the overall population growth for this period was equal to 14.5%. Also, the average annual growth rate was 7.4%. In addition, the average income change, median employment change and the ratio of car usage were 57.7%, 1.19% and 12.43%, respectively. Over the period (2006- 2011) car usage for commuting to work has decreased from 67.02% to 66.31% too. The results of this research show that in spite of a 10-year strategic plan focused on the enhancing the compactness of Melbourne, efforts have not been successful. Finally, this paper presents some recommendations to enhance the compactness of Melbourne in the future.

CS1-d Geography, Environment and Education I

Geography field expeditions at the National University of Singapore: student expectations, experiential learning and achievements in Fiji and Cambodia

by *James Terry and Carl Grundy-Warr*

The importance of including field studies within the undergraduate geography module offerings at the National University of Singapore (NUS) has long been recognised as an imperative for a well-rounded geography curriculum. Overseas field expeditions present students with unique opportunities to be immersed in a diverse range of physical and human environments not seen on Singapore Island, and so are of special value and relevance. Students learn new methods, hands-on skills and use of modern equipment for observation and data acquisition, and in spite of (or perhaps because of) the sometimes physically demanding conditions, they are able to interact more closely with their peers and academic supervisors than is possible in a traditional classroom setting. Furthermore there are pedagogical, experiential and inter-cultural dimensions of field investigations that require deeper analysis particularly as these aspects often involve learning beyond the precise parameters of projects and standard assessment exercises.

Since 2012, driving forward on initiatives for expanding the offerings at NUS, two new field investigation modules have

been established at Honours level in physical and human geography, the main components of which are overseas expeditions to remote locations in Fiji (South Pacific) and rural areas of Cambodia. Although the academic goal is to deliver a lifetime learning experience in distinctive geographical settings what are the real or perceived benefits as viewed from the students' perspectives? To examine this question, we analyse surveys and student accounts of their own fieldwork experiences. Through these we are able to reveal multiple dimensions of the process of learning-by-doing.

Another critical aim of our work is to consider how the same generic field investigation model may be taught as a specialised physical or human geography module. In this way, the fieldwork can strengthen particular forms of knowledge through the application of very different methods in the field. Importantly, it is evident that deeper learning is much better achieved by developing close collaborations with host institutions researchers and practitioners, and with local communities. Knowledge of context and place stand out as essential ingredients to establishing successful professional and cultural exchanges in field situations, as well as encouraging host-visiting student relationships within a relatively short period of time. Finally, we also illustrate how and why familiarity with local geography, intimacy with local people, and prior experience (and research) of the expedition leaders are all crucial elements. Together these elements help both create multiple field-based learning opportunities and enrich cultural encounters, which make field expeditions a particularly intensive, and we believe, essential feature of geographical education.

Development of an app to analyse and visualise water quality data: use of mobile technology to enhance student experience in field investigations

by *Vernon Tan*

Mobile devices are on a trajectory to gaining widespread adoption in the education arena, and with smartphones and tablets reaching into the hands of students the world over, there is now an unprecedented access to information. Mobile devices should not be viewed as mere portable counterparts to the traditional desk-bound computers of decades past. These devices, in particular, have the unique capabilities of supporting social interactivity between the students and providing context sensitivity to their current physical locations. Such functionalities will allow for the integration of a plethora of educational learning theories in order to create more activity centred programs that can further enrich the students' learning.

The focus of my research is on the development of a mobile GIS application that has the visualisation capability of displaying on-the-field acquired information as pins on a digital map. These pins are designed to be dynamically colour coded to represent the current water quality condition of every individual data point recorded by the students. The pins represent the value of a water quality index that is calculated based on the input of 9 constituent parameters (which include dissolved oxygen, E.coli, pH, biochemical oxygen demand, temperature change, total phosphates, total nitrates, turbidity and total solids) for each sample site. Commercial kits are readily available to test for these parameters and the test results are fed directly into the app to compute the overall water quality index on-the-fly without the need to transfer the data back to a separate spreadsheet for analysis. Most importantly since the data for a project can be synchronised in real time the results of the water testing can be seen and interpreted immediately during the field trip itself (with the exception of E

coli) and this allows the students (and teacher) to perform quick visual analyses to find the relevant spatial distribution patterns.

Having developed the app in the context of Singapore, and from the vantage point of an educator, I have also identified how the app can be integrated into a primary school Science syllabus. In this presentation, I will explain how the lessons can be structured around the widely adopted 5E instructional mode for Singapore and designed to enable the students to collaborate with the wider community – either locally or globally – on long term water quality monitoring projects.

Ultimately, this app could work extremely well as a crowdsourcing platform to connect students, schools and community users across national boundaries and help them exchange water quality values due to the syncing capability, as long as users are signed-in to the same account. Using this app, users who are at different places the world can collaborate with one another without being hampered by the physical distance that separates them, and they will be able to get an update of each other's data instantaneously. This level of speed at which the data gets synchronised across devices opens up the possibility of creating a distributed and inter-networked mobile GIS system to facilitate the capturing and sharing of information.

The experience of undergraduate students in Geography fieldwork: a revisit/reappraisal

by *Enrico Garcia and Mark Alvin Cruz*

One of the least utilized methods in teaching and learning geography is fieldwork. This is perhaps due to the tedious nature of this method and safety considerations for the learners. Despite this, there is a general agreement among geographers and geography educators that fieldwork is really a vital element of geography education. Fieldwork is a learning methodology wherein students can connect theories or geographical concepts to the real world. The present study focused on the experiences of undergraduate students in conducting fieldwork in a World Geography course at Philippine Normal University - National Center for Teacher Education. This study is anchored on the concept that geography fieldwork is an educative experience for the undergraduate students whose attitudes and behaviors will eventually affect their new perspectives on fieldwork as a meaningful venue to more experiences in life. The results suggest that fieldwork can give both pleasant and not so pleasant experiences to the students, which can hone their skills as future educators. Also, through the thinking skills model developed by Carol McGuinness, it is also found out that various thinking skills were developed among the students after conducting fieldwork. Some of these thinking skills include planning and goal setting, collecting information, making decisions, problem solving, and reflecting on one's progress; all of which are very important in facing future endeavors in life. Lastly, it is also found out that the students had a better appreciation and a positive perception of fieldwork as a learning methodology.

Concurrent Session 2:

CS2-a Journal Publishing in Human Geography: A Roundtable with Editors and Publisher on Tips, Pitfalls and Politics

Journal publishing in Human Geography: a roundtable with editors and publisher on tips, pitfalls and politics

by *Kay McArdle, Harvey Neo and James Sidaway*

This roundtable session will feature a distinguished panel of speakers who serve in various editorial capacities for Geography Journal published by journals. The members of the panel include James D Sidaway who is Associate Editor of the journal Political Geography, Harvey Neo who is the co-Editor of Geoforum, and Kay McArdle who is the publisher, for Geography, Planning and Development Journals, at Elsevier. There will also be a Q&A section at the end of this roundtable for academics and scholars aspiring to publish in these journals.

CS2-b Special Panel on Agrarian Change and Rural Development in Southeast Asia I

Taming the border landscape: Chinese diaspora and the politics of cross-regional transfer of agricultural technology at Northern Thailand

by *Po-Yi Hung and Chunyi Hsu*

This paper aims to explore the relationship between the cross-regional transfer of agriculture and the territorial politics in northern Thailand. North Thai borderlands were famous with opium production. However, nowadays the extensive landscape of opium production has been substantially changed to places for cultivating different kinds of cash crop, including vegetables, fruits, tea, coffee, and rubber. The significant landscape transformation, from opium poppy fields to cash crop plantations, is an outcome of the Thai Royal Project. Various countries have participated in the transfer of crop and agricultural techniques for the Thai Royal Project. Among these countries, Taiwan is recognized by the Thai government as a country that has most successfully transferred its crops and agricultural techniques to the northern Thailand.

Taiwan's participation in the transfer of crops and agricultural techniques, nonetheless, has not been just for the Royal Project per se. Rather, the agricultural transference from Taiwan was also for a specific group of Yunnanese Chinese. This group of Yunnanese Chinese used to fight the Communist Party for the Kuomintang Party (KMT) during the civil war in China. The Communist Party took the power in China in 1949 and then the KMT subsequently formed the central administration of Taiwan. Consequently, many Yunnanese Chinese retreated from Yunnan to north Thai borderlands as KMT soldiers, belonging to the military troops of Taiwan. This paper, therefore, intends to shed light on how the agricultural technology transfer was not just a mission to erase opium production, but also a geopolitical process to turn the KMT soldiers of Yunnanese Chinese into farmers of Thai citizens. Using tea as a key example, this paper analyzes that the transfer of agricultural technology, tea cultivation in particular, has been a political project to transform a murky terrain of battlefield into a legible land of agriculture in northern Thailand.

Trajectories of commercial cassava farming in Cambodia*by Sothorn Kem and Rob Cramb*

Cambodian agriculture is now undergoing a transformation from subsistence to semi-commercial and commercial production. This is indicated by the growth in area, yield, and exports of commercial crops. Several factors, including regional and international market demand, infrastructure development, technological innovation, trade and credit liberalisation, and foreign direct investment have stimulated the transformation. Cassava is now among the top commercial crops produced and exported, but little is known about the dynamics, trajectories, outcomes, and challenges of the cassava sub-sector. This paper explores the major drivers of the cassava boom in Cambodia, the outcomes and livelihood implications of this transformation, and the challenges faced by cassava farming households. The paper is based on the results of a survey of cassava farmers in contrasting settings – Pailin Province in the west, which has been the site of in-migration and the opening up of land for commercial cultivation, and Kampong Chan Province in the east, where existing farm households have shifted from subsistence to semi-commercial or commercial cassava production.

Fragmented territories: land formalizations and the transformations of agrarian systems in North-west Cambodia*by Jean-Christophe Diepart and Thol Sem*

In Southeast Asia large-scale land acquisition and land titling are becoming increasingly connected, due to the growing spatial overlap and convergence of the political economy of both processes. Titling is seen as a tool to provide land security to smallholder landholdings against large-scale land acquisition that come under the rubric 'land grab'. Yet, these relationships are complex and non-linear. Hirsch (2011) provides a useful framework highlighting a specific set of land tenure questions to address them. In Cambodia these interactions have gathered momentum in 2012-2013 when the Royal Government initiated an unprecedented upland land titling program (Order 01) in an attempt to provide land security in conflict situations where agro-industrial economic land concession (ELC) overlap with land appropriated mostly by migrant peasants. Against this background, we are specifically interested in looking at the transformations of agrarian systems in areas where both large scale land acquisition and land titling are partially implemented a situation that prevails across Cambodia and that is not sufficiently addressed in current 'land grab' debates.

In the paper, we show how partial implementation of land titling and ELC is superimposed on existing land tenure regimes: for example the post-war land distribution by Khmer Rouge. This entanglement of land tenure regimes lead to a diversity of land-people assemblages inside and around the concession with the nature of land [in]security distinct to each 'zone'. Further, we show how these land dynamics intersect with the development of a pioneer commercial agriculture characterized by high levels of indebtedness and the rapid formation of agrarian classes, which is indicated by the transformation of annual cropping systems (corn, soybean and cassava) into small-scale perennial crop plantations (pepper, rubber, durian). The intersection of both processes is what we are calling the 'fragmentation of territories'. We suggest it is probably at play across Cambodia given the nation-wide redeployment of land property right resulting from Order 01 (particularly in regions where ELC are more important such as in South-West and North-East). We argue it is central in current rural transformations as it results in i) profound transformations of

household labor management systems (intra and inter households, wage labor and international migration to Thailand and *ii*) increasing contradictions between process of state formation at national and local levels with new peasant mobilization around the question of land rights. The research focuses on territorial relations in and around Rath Sambath concession (rubber plantation, 5200 ha) in Samlaut district Battambang province where we conducted field surveys in 2014. We organized field surveys in four different villages that represent the diversity of land fragmentation in and around the concession. In each village, we conducted a participatory mapping involving 5-6 people to elicit land use/tenure changes in the area. We then conducted a series of in-depth household interviews (n=30 HH) and semi-structured interviews with territorial authorities at provincial, district, commune and village level (n=10) and staff working in the concession.

CS2-c Environmental Challenges in Southeast Asia I

Environmental gradients at the altered forest edge: Bukit Timah Nature Reserve, Singapore

by *Kalyani Chatterjea*

Bukit Timah Nature Reserve (BTNR), a lowland dipterocarp forest, has been legally protected as a nature reserve since 1951 and even today retains much of its original tropical rainforest characteristics. Interior forested areas still have the warm, moist and still environment, with little sunlight penetrating through the canopy to the forest floors. Although there have been some low-level disturbances from scattered rural housing around the forest in the past, the forest fringes remained more or less undisturbed till the surrounding area was declared as a residential zone in the 1990s. Since then, many high-rise buildings and major roadways have been constructed, ever separating BTNR from the much larger forest of the Central Water Catchment (CWC). The perimeter of the forest has been exposed to non-forested urban landscapes. This research examines the degree of environmental difference such a non-forested exposure has caused and analyses the environmental changes brought about. Results show steep environmental gradients (temperature, relative humidity, wind velocity) at nearly all the forest margins. Air temperature differences range from 5-13° C, while relative humidity drops by 15-20% at the outer peripheries. Winds are erratic and sudden gusts of 6m/s are not unusual even on normal days along the edges with major roads while wind at the forest interior remains still at 0m/s. The cumulative result of such changes is a drastically altered environment at the forest peripheries, which may impact the forest interiors if gradients of impact are steep.

Detecting the changes of shoreline and riverbank for Tien River in area of Dong Thap Province, Mekong delta from remotely sensed data

by *Hung Pham, Hoanh Trinh and Minh La*

Nowadays, with outstanding advantages, remote sensing technology plays an important role in the area of natural resources management and environmental monitoring. Multi-temporal remote sensing data offer a valuable source of information to monitor changes of natural features and phenomena including changes to shoreline and riverbank positions. In recent years, under the impact of climate change and global warming, various sections of Tien river – the main northern branch of the Mekong River through Dong Thap province, Vietnam have been eroded and accreted tremendously. According to previous studies, the annual

average rate of erosion in upstream areas is from 5 to 30m (Quang Hai, 2008). This caused a lot of difficulties for living and manufacturing activities. Therefore, the purpose of this study is to evaluate and to predict the rate of riverbank and shoreline changes in area of Tien River through Dong Thap province. In this study, multi-temporal optical remotely sensed data (Landsat MSS, TM, ETM+, and OLI) from 1989 to 2014 and topographic maps from 1966 to 1968 were used to analyse the changes of Tien's riverbank and shoreline. The outcomes were derived from the processing algorithms and image interpretation on commonly used GIS and remote sensing software, such as ENVI and ArcGIS Desktop. The results show that Sa Dec, Thanh Binh and Hong Ngu district have high rates of erosion of 30m per year and the river will erode about 100m in next 10 years.

Rural solid waste management: a preliminary study on waste management practice by rural residents in Kuala Penyu, Sabah, Malaysia

by *Mohammad Tahir Mapa, Kntayya Mariappan, Moreen De Silva, Paul Porodong, Diana Peters, Maine Suadik and Gaim Lungkapis*

In general, the increase of domestic waste could be attributed to the increase in population. In rural areas, the production and composition of solid waste is different from that of urban areas. There are several factors affecting the situation such as cultural differences and the waste management system that is used in those areas. Apart from this, the type of economic activity and the level of development are also a major determinant in the production of solid waste. By using questionnaires and interviews, this preliminary study intended to observe the behavior of rural communities towards waste disposal. A total of 384 people were randomly selected as the respondents to represent the population. Respondents involved were residents of the Kuala Penyu District, which is categorized as a rural area. The local authority officers also were interviewed in order to obtain data on the current management system. The study found that the respondents preferred to burn or bury their daily waste. This is because most of the respondents live beyond the council assessment area and do not receive waste collection services. In addition, the council also is faced with several constraints such as lack of waste collection vehicles to expand their services. The study also found that the majority of the respondents anticipate that their daily waste will be collected by the council in the near future as a way to improve the environment and their health.

CS2-d Sustainability and Development

Malaysia's pathway towards sustainable development targets: timeline, strategies and challenges

by *Noranida Mokhtsim and Khairulmaini Osman Salleh*

Environmental management strategies would provide the guiding stone as Malaysia charts its development programs towards achieving and develop industrialized nation state. This paper provides a timeline perspective of Malaysia's efforts in environmental management strategies and their implementation at the national, regional and global scales. Timeline analysis shows that Malaysia's environmental management strategies become more structured and coherent with the implementation of the Malaysia's Environmental Policy of 2002. Secondary and primary data reveal that prior to 2002; environmental management efforts were mainly centered on pollution abatement programs including the set-up of Environmental



Quality Act 1974. Increasing intensities, frequencies and diversity of environmental issues at the internal, regional and global scales had impacted Malaysia in the last two decades or so and thus the need for more stringent measures of management. Malaysia, through the 8th Five year Malaysia Development Plans and the Malaysia Environmental Policy 2002 have outlined strategies to address the issues of environmental degradation internally. This commitment has now moved at the regional and global levels, where Malaysia has been consistently been threatened with many life threatening issues in the last half decade or so including haze episodes, SARs, H1N1, etc. The method used for this study involved both qualitative and quantitative analysis and gathering data are from primary and secondary sources. The raw data gathered will be analyzed using statistical analysis and atlas ti analysis. To sum up, the results will show the trend of environmental management strategies and also provide a SWOC analysis of these strategies.

Development of tourist facilities due to the status transition of village into tourism village: a case study in Gubugklakah Village, Malang, Indonesia

by *Adelina Chandra, Diah Rossy Pratiwi and Noer Sulistyarini*

Gubugklakah village is located in eastern Malang, Indonesia. The settlement has grown along the main road towards the Bromo Tengger Semeru National Park. Natural resources in the region that support the development of tourism for the village include, fertile soil for the cultivation of apples, beautiful landscapes, and waterfalls. Increased public awareness of the potential development of natural resources, brought changes to the tourism sector. In 2009, young villagers formed LADESTA which was initiated by the local community to support the development of Gubugklakah into a tourism village. In 2011, the government approved the LADESTA proposal to change Gubugklakah village's status to a tourism village. This research focuses on the development of tourist facilities that has resulted from the village status transition. Typically, tourist facilities consist of three layers, namely, primary, secondary and conditional facilities. These three layers were determined and mapped to the tourism development in the village since the status change. The method adopted is one of descriptive spatial analysis of observations and interviews conducted in the field. The results of this study indicate that there are increasing numbers of primary, secondary and conditional tourist facilities. In fact, the development occurs linearly along the main road of Bromo Tengger Semeru National Park. The authors suggest that the status change, which was a result of the empowerment of rural communities, has helped to improve the economic sector of the Gubugklakah tourism village.

Suitability analysis of economic share and employment share on ASEAN member countries based on main sector industries toward ASEAN economic community (AEC)

by *Warastri Laksmiasri, Nur Wiryanti Sih Antomo and Latifatul Khoiriyah*

The realisation of the ASEAN Economy Community (AEC) is a common goal for all ASEAN member countries to achieve real and meaningful economic integration. On the other hand such cooperation has led to increased competitiveness of the ASEAN region in world trade, which promotes economic growth to reduce poverty, and improve the living standard of the ASEAN members. AEC has four pillars, but this study only focuses on the first pillar, specifically ASEAN as a single market and single production-base, supported by elements of the flow of goods, services, investment, skilled labor, and freer flow of



capital. The purpose of this study is to identify the function of priority integration sectors (PIS) on the AEC with the economic structure of national accounts at constant prices by industrial origin. Calculations in this study, using the formula by Sukirno (2007), were used to derive the proportion of income in the preference of dominance by industrial origin and the proportion of revenue as the assumption of the productivity of the industrial origin.

Liberalization of trade in goods, services, investment, and skilled labor moving freely in 2015 is a manifestation of the first pillar. ASEAN member countries showed potential growth based on available resources. The goal of the identification trends of the national economy accounts at constant prices by industrial origin structure is showing a map of potential PIS ASEAN member countries in the future. This study also can identify countries that are not included in the PIS endeavour.

Vietnam, an opening under control: Lao Cai on the Kunming-Haiphong Economic Corridor

by *Marie Mellac*

Lao Cai city, like most Vietnamese cities, did not escape the dramatic construction and huge urban expansion of the past decade. Such metamorphoses can be explained by Vietnam's recent rapid economic growth and are emphasized by the Lao Cai location on the Chinese border. Local officers justified urban transformation by their will to capture ongoing institutional opportunities and investments in the context of the Greater Mekong Subregion (GMS) policy. They also want to get the city ready for the opening of the border and the Chinese "go west" policy. In 2010 however, transformation remained largely disconnected from the local economic reality: uneven and imbalanced commercial relations with China; poor FDI oversized or unused city equipment, etc. The city also remained partially landlocked due to poor transportation infrastructure between Hanoi and Lao Cai and to a still difficult border crossing for trucks and goods. This disconnection or gap between city planning and economic reality is discussed in the context of the decades of isolation and disputes which characterized the Vietnam-Chinese relations. This paper emphasizes the role of the territorial representations resulting from the contentious and ambiguous relations between the two countries. My hypothesis is that these representations are subjective but long lasting factors which impact on regional construction and on transnational territorial construction in various diffuse but significant ways. Representations vary according to the level of the institutional (political and administrative) actors considered. In order to track down their impact, this paper considers different scales and actors perspectives. It starts at the local level by studying the Lao Cai case, considered both relatively to its location at the Chinese border and along the Kunming-Haiphong corridor. It questions then what is observed at this level compared to national and international scales.

Concurrent Session 3:

CS3-a Special Panel on International Volunteerism and Development in Asia-Pacific I

The Other in close quarters: volunteers for migrant worker NGOs in Singapore

by *Sallie Yea*

Social science literature on both volunteerism and volunteer tourism has tended to focus on the interstices between



overseas travel experiences and development volunteering both for students and the general public. Some of the most fascinating subjects to emerge from these discussions include the extension of Othering processes to volunteering, the motivations of volunteers (self versus altruism) and how these affect the developmental outcomes of volunteering, and the relations that define interactions between volunteers and communities they serve. To date, this literature has not engaged with volunteerism that takes place within one's 'home country' where subjects of helping are nonetheless racially and developmentally inscribed "Others". This occurs despite the fact that there appears to be significant thematic parallels between these two expressions of volunteering. This paper attempts to make some preliminary inroads into exploring some of these parallels through an examination of volunteers with NGOs oriented to migrant worker supports in Singapore. Semi structured interviews were conducted with a total of 12 volunteers from four different migrant worker and anti-trafficking NGOs in Singapore to inform discussion.

International Development Volunteering from Singapore to Cambodia: how relationships impact development

by *Jinwen Chen*

How do relationships in International Development Volunteering (IDV) affect development? While much of the literature on IDV focuses on self-other and cross-cultural relationships between volunteers and local beneficiaries usually from the perspective of the volunteers, the link between these relationships and material impact of development has not been clearly elucidated (e.g. Palacios, 2010; Diprose, 2012). Instead, majority of researches has focused on relationships discursive impact on development, where poverty becomes understood by volunteers as an apolitical, essential condition of the 'third world' which can be alleviated simply by 'first world interventions (Simpson, 2004; Mostafanezhad, 2014). Moreover work on IDV has mostly focused on the individual scale of the encounter, lacking a more critical link to the wider structures of international development and relationships between countries (exceptions include Baillie Smith and Laurie, 2011).

Hence, I tackle these two gaps in my paper, looking into IDV projects by the Singapore International Foundation (SIF) as a case of how relationships produced in IDV impact development. SIF's vision of "making friends for a better world" makes it an apt case study to examine how convivial relationships, among others, impact development goals. Examining SIF IDV projects where Singaporean volunteers do development work in Cambodia, I draw on qualitative fieldwork with IDV stakeholders from Singapore and Cambodia – organisations, volunteers and local beneficiaries – to elucidate the relationships formed on the individual, organisational and international scale. Using a development geography perspective, I show how relationships can be conceptualised not only as means to (material development, but as also ends in themselves. Positive relationships of care, reciprocity and trust between volunteers and locals and between SIF and its partner organisations facilitate the short-term implementation of development projects. Moreover, these positive relationships can be stretched across time and space in the form of social capital, where the connections forged between Cambodian locals and Singaporean volunteers allow the former to benefit from resources in the latter's social networks in the long-term. Nevertheless, unequal relationships of power and inequality persist, and have repercussions on the practice and impact of development. Finally, taking a step back to see SIF as an actor in a development relationship between Singapore and Cambodia, I draw out the differing impacts of IDV on the 'development' of both countries, and their subsequent implications on IDV as a form of development on a regional

scale.

Transcendence and potential: the volunteer-host encounter and embodied development imaginaries

by *Mark Griffiths*

This is a story about a group of westerners in contact with Others. At the beginning—it is important to remember—the encounter is simultaneously facilitated and bounded by neoliberal globalisation: the westerners travel over an unfettered Earth, pulled by notions of self-advancement and pushed by the chance to write their identities. The Others enjoy limited mobility—they rarely move—and they are exactly as passive as the westerners are active. Skewed geographies separate these groups. But this is also very much a story of bodies together, drifting through contingent moments that animate connections between disparate peoples. Contact begins hard but softens in its unfolding on non-verbal channels; it reverberates through the body and incarnates as sensation: without names. This is a story that asks faith, begs you to suspend what you know, allow yourself to touch and be touched.

Child emotional labour in Cambodian orphanage tourism

by *Tess Guiney*

Experiences involving vulnerable children are amongst the most recent and popular volunteer tourism practices. Celebrity humanitarianism and aid campaigns promote images of vulnerable children receiving love and care from international celebrities and actors, most commonly Western women. This stereotyping of care and love provision from Westerners (often women) to children from 'developing' nations has created a surge in popularity and the expectation of relationship creation and close contact through such experiences. Orphanages are particularly popular settings for this niche tourism in countries such as Cambodia. Expanding upon emotional labour literature this paper illustrates the stress that children in these spaces are exposed to, similar to service workers who have to mediate their behaviour and conform to tourist demands due to their role as 'consumer' in this transaction. Emotional labour literature has not previously considered children, however, the service role children play in these tourist transactions is clear. Drawing upon four months of ethnographic research in Cambodia in 2011 and 2012, this paper argues that the commoditisation of children through orphanage tourism experiences has resulted in certain expectations being placed upon them. For instance children are expected to be poor-but-happy when engaging with volunteers and visitors, encouraging intimacy to conform to tourist expectations. The performance of this behaviour is mediated and controlled by their emotional supervisors in the person of orphanage directors. Through tourism, children are now at the mercy of neoliberal forces, commoditising their love and emotions and creating space for exploitation. This can place significant stress upon them and can be seen as exacerbating the myriad harmful impacts of institutional care. The impact of alternative tourism trends upon host communities such as these children, is an underdeveloped research field yet such interactions are having potentially profound impact in many nations.

CS3-b Special Panel: Dams on the Mekong River's Tributaries**Session overview of the panel on strengthening transboundary cooperation in the context of climate change**

by *Mak Sithirith*

The 3S River Basin is the largest of all the major tributaries and watersheds of the Mekong River Basin. Located at the triangle area of Cambodia, Lao PDR and Vietnam, the 3S River Basin consists of three main river basins—the Se San, Se Kong and SrePok. While the Se Kong River originates in Laos, the Se San and SrePok Rivers have their sources in Vietnam. The three rivers flow through the northeastern territory of Cambodia in Ratanakiri and Stung Treng Province and they meet in Stung Treng Province before reaching the Mekong. The Basin is home to nearly 3.5 million people belonging to nine ethnic minorities; over 3 million of which live in Vietnam, 222,000 in Laos and 193,000 people in Cambodia. Members of said ethnic groups are considered poor (Grimsditch, 2012; MRC, 2010). Moreover, the 3S River Basins have for a long time been viewed as an area 'suitable' for development and especially regarded as an ideal location for hydropower development. More than 20 hydropower projects have been built or are currently under construction, with most activities happening on the Vietnam side of the river. Vietnam's hydropower development had been most extensive to date and has already taken its toll on the health of the Se San and SrePok basins in the Central Highlands of Vietnam and downstream in northeastern Cambodia (Grimsditch, 2012). These developments threaten the sustainability of the river that is shared by the three countries.

The construction and operation of 20 large hydropower dams in the upper stretches of the 3S Rivers in Vietnam has already had severe negative impacts on local communities in Cambodia. This is apparent in decreased fish stocks, erratic water levels and reduced water quality. Additional construction of dams would further alter the basin's natural resources through changes in the region's water flows and water quality as well as land use and forest cover. In addition, the introduction of concrete physical structures would block important fish migration routes and therefore changing aquatic habitats required for the migration, spawning and feeding of fish. This in turn could disconnect people from their traditional livelihoods and forms of resource management, which would have serious economic and social implications to the future of environmental sustainability, landscape quality and biodiversity (Ojendal et al. 2002; Sithirith, 2000).

Dams on the Mekong tributaries: strengthening transboundary cooperation in the context of climate change

by *Yong Jiang and Jaap Evers*

Transboundary issues in the Mekong basin are expected to occur more often in the future due to increased development pressure on water and land resources, which may be further exacerbated by the potential impacts of climate change. This panel is intended to contribute to understanding of transboundary issues associated with water resource development, hydropower dam development in particular, in the context of climate change. It will present studies from the Theme 4: Transboundary Cooperation for Sustainable Water Management and Climate Change Adaptation of the Postgraduate Program on Climate Change Adaptation (PROACC) Phase 2 of the UNESCO-IHE Institute for Water Education.

In this panel, three studies will be presented, which focus on the Sesan and Srepok (2S) Basin of the Lower Mekong as the



case study area. The first study by Dr Ngo Le An from Water Resource University Hanoi (Vietnam) is mainly focused on the biophysical and hydrological aspect of transboundary water resource development. It introduces a modelling framework for simulating the hydrological impact of reservoir operation under different scenarios on the Sesan River, which would allow hydrological assessment of dam development and climate change as well as the identification of physical and management mechanisms for impact mitigation. The second study by Dr Seak Sophat from Royal University of Phnom Penh (Cambodia) is dedicated to the environmental and socio-economic impact of hydrological change. It examines local vulnerability and the impact of hydrological change due to dam development and climate change on local livelihood and biodiversity in the Cambodia part of the 2S basin, and expects to identify strategies to mitigate the impact and enhance local resilience to hydrological change. The third study by Dr Mal Sithirith from Royal University of Phnom Penh (Cambodia) is focused on water governance and institutions of transboundary issues. It looks into the legal, political, and institutional aspects of transboundary water resource development in the Mekong and attempts to identify mechanisms to promote transboundary cooperation on Mekong tributaries.

This special panel showcases an integrated approach to studying transboundary water issues, encompassing the biophysical, social, economic, political, and institutional aspects. It is of strong policy relevance to water resource management and governance in the lower Mekong. It will likely stimulate policy discussion among professionals from academia, governments, and NGOs.

Impacts of reservoirs operation on hydrological regime in the Sesan River basin

by *Le An Ngo and Ilyas Masih*

Sesan river basin is the “hot-spot” area for reservoir development in the region. Two (2) reservoirs are due for construction on the Cambodia territory in addition to seven (7) already built on the Vietnam territory. These reservoirs can change the water flow regime whose impact needs detailed assessment. This study presents the result of reservoir operation simulation under different scenarios and their impact on hydrologic regime. It utilized SWAT for hydrologic simulation and WEAP for water balance estimation and reservoir operation. The SWAT model was developed for runoff simulation on tributaries and mainstems where no hydrologic data is available. The result of the simulation represents the “base scenario” which is used to compare with “reservoir scenarios”. The WEAP model was established to estimate the water balance including irrigation activities and hydro-power generation. Two reservoir operation scenarios were selected for the study, which included the maximum hydro-power capacity generation with (W) and without (WO) taking into account the minimum flow in downstream.

The results of the study showed that both “reservoir scenarios” will cause the volume of flow to increase in dry period (December - June) from 20% (WO) to 40% (W) on average and to decrease in wet period (July - November) from 3% (WO) to 8% (W). The month of September has the highest flow in base scenario. This changes for the months of August (W) and July (WO) with the reservoir scenarios. The results also showed that full capacity could be achieved only in the months of July to September in most years. For the period of October to June hydropower cannot be generated to full capacity due to limitations of water availability and storage.

Despite the insufficiency of available hydrologic information the study illustrated a reasonable assessment of impact of the tested reservoir operation scenario to hydrologic regime in downstream through the SWAT and WEAP models. This approach can be applied to assess the impact of climate

change and water allocation in studying transboundary water management.

Assessing the impacts of hydropower development and climate change on rural livelihood and biodiversity in the Sesan and Srepok catchment, Cambodia

by *Seak Sophat*

The Sesan and Sreport Rivers (2S) are regarded for their exceptionally rich stock of natural resources and biodiversity. The basin of the rivers serves as a single source of livelihood for ethnic minority groups in northeastern Cambodia. It is also considered an important source of natural capital for the development of Cambodia's economy in terms of agro-industrial crops, hydropower dams, mineral stocks, and potential for non-smoke industry ecotourism. Moreover, the 2S river basin was rated a global biodiversity hotspot, which is of great significance in the field of global conservation.

The 2S catchment of the lower Mekong supports the livelihoods and traditions of nearly 3.5 million people belonging to ethnic minority groups. On the Cambodia side, over 20% of the basin had been designated as protected area systems in the form of wildlife sanctuaries, national parks, areas for biodiversity conservation, and protected forest areas. However, with climate change and the rapid development of mega-scale projects such as hydropower dams and agri-business in the upper regions of Vietnam and Cambodia, tremendous changes in water flow regimes have adversely affected the 2S river basin. Dams in Vietnam specifically caused the emergence of transboundary issues, which have become physically visible in Cambodia's downstream area. The major physical impact can be recognized in riparian community livelihoods, fish and related wildlife as well as flood and drought damages. As the dimension of impact caused by flow changes are not scientifically investigated, this paper comparatively analyses the particular impact of water flow changes in the 2S Rivers on rural livelihoods, loss of fish and other species, which depend on the rivers for survival. The paper also suggests management and adaptation strategies for rural livelihood enhancement and biodiversity conservation which take into account hydropower development and climate change in the 2S River region.

CS3-c GIS & Remote Sensing

Traffic and urban noise: quantitative analyses of soundscape in Taipei City, Taiwan

by *Bing Sheng Wu*

Urban noise has long been discussed as a cause of a myriad of health problems. A major source of urban noise comes from vehicular traffic. While traditional approaches to analyze traffic commonly record amplitude, little research has been done to describe the patterns of these sounds. Schafer (1993) proposes the use of urban soundscape to describe the array of always present noises that are identified within an environment from both the dimensions of amplitude and frequency. Based on the theory of urban soundscape, this study examined the dominant noise sources of vehicular traffic and analyzed the spatiotemporal distribution of soundscapes. Three key variables-- amplitude, frequency spectrum, time-- were recorded at four urban sites (downtown, one commercial, and two residential areas) in Taipei City, Taiwan. After a half-hour long sound recordings at each site, frequency of traffic noises were visualized by seewave and RAVEN software. The Principal Component Analysis (PCA) approach was adopted to represent how amplitude, frequency, and time affect traffic noises at various urban sites. Based on sound profiling by the Ministry of Transportation and Communication (ie. high



frequency sound come from four-wheel cars while buses give off sound of lower frequency), the results showed that high frequency sound tends to appear in commercial areas in the afternoon and evening while lower frequency sound was often recorded in residential areas during daytime. Thus, sound from cars was a prevalent source of noise in commercial areas while sound from buses dominated noise in residential areas. In summary, key features of different types of traffic noise were depicted more accurately through quantitative analyses of urban soundscape. Having a better understanding of noise types can help in urban planning especially for strategies such as active noise-canceling, and ultimately in improving the quality of urban life.

Compositions of spectral and ancillary data in land cover classification: a case study in Hoa Binh, Vietnam

by *Thuy Hanh Nguyen Thi and Dien Tran Ngoc*

Hoa Binh is a mountainous province in northwest Vietnam. Since the 1980s, the province experienced rapid deforestation as its hillsides were used for growing food crops. Forest cover was at its lowest in the late 1980s to the early 1990s. By mid 1990s, this trend has been largely reversed and forest cover has increased notably through natural regeneration and the extension of tree plantations. Presently, natural forests only exist at high level of elevation because of more difficult accessibility while barren hills at low altitude have greened and regenerated. Due to the physical characteristics and the distribution of forest types in Hòa Bình, this study integrated DEM and NDVI into spectral bands of Landsat 8 image in order to remove the influence of shadow to imagery classification, separate natural forests from planted forests and establish land cover map of Hòa Bình in support of the annual forest inventory at provincial level in Vietnam. First, the image was georeferenced to VN-2000 (contemporary coordinate system in Vietnam). The DN images of bands 4 and 5 were then converted to reflectance for NDVI calculation. In addition, DEM was generated from topographic maps scaled 1: 50,000 with 40 m contour interval. Finally, classification was carried out on multisource dataset (bands 1, 2, 3, 4, 5, 6, 7, 9, NDVI and DEM) in comparison to the result of spectral image in terms of accuracy. The results indicated that user accuracy and producer accuracy of natural forests increased from 75.18% to 89.54% and from 74.86% to 86.15%, respectively. As for regenerated forests, these numbers also rose from 78.35% to 85.62% and 80.53% to 90.86%. The accuracy of planted forest identification went up to 8.43% (Use.Acc) and 11.28% (Prod.Acc). However, discrimination of barren land, agriculture settlement, water bodies and others increased insignificantly from 1% to 2%. Generally, the overall accuracy improved with 5.23% (from 84.51% to 89.74%), as well as with kappa coefficient of spectral classification at 0.72 in comparison to 0.86 of ancillary classification. In other words, integration of DEM and NDVI allowed for the identification of natural forest and planted forest in Hoa Binh, as well as improved the accuracy of classification result.

GIS Application for blood donor active mapping in Yogyakarta City

by *Gerry Utama, Bernadetta Alnybera Febrianningsih and Ratri Marifatun Nisaa*

The availability of blood stock in hospitals or blood banks such as the Indonesia Red Cross is a basic requirement in health service delivery. It is a reality, however, that the need for blood usually exceeds the supply available. This research in Yogyakarta City, Indonesia examined how to make it easier for people to voluntarily donate blood. In mapping potential blood donors, the researchers extracted information from satellite images of high-resolution remote sensing to show information of spatial community settlement. Surveys were also conducted with the population to gather data such as blood type and basic demographics. The data was then processed through spatial modeling and data representation with Geographical Information System (GIS). Results of the research have shown that half of Yogyakarta region is qualified to donate blood. There are more individuals with blood types A & B while those with O and AB types is lesser in number. This research recommends for Indonesia Red Cross to conduct blood donor drives based on spatial and empirical understanding of available supply.

Using Open Source Web-Based GIS for publishing and querying cadastral information in Long Xuyen City, An Giang Province, Vietnam

by *Hung Pham*

Nowadays, web-based GIS or WebGIS is becoming an important tool for sharing, querying and analyzing geographic information. By using Internet GIS applications, users may view, query, analyze and download spatial information from anywhere at anytime. The cadastral dataset, like any other GIS dataset, consists of spatial components and associated attribute information. Publishing the cadastral dataset via the Internet is one of the most important tasks in land management in many local provinces and WebGIS is considered one of the best modes to do so. In this paper, I discuss how the system of WebGIS for displaying cadastral information of Long Xuyen city, the second largest city in the Mekong Delta, Vietnam, was built on the open source WebGIS with three-tier architecture. The cadastral data were imported and stored in PostGIS, which was a support system for geographic objects to the PostgreSQL object-relational database. The server-tier included Apache HTTP server and GeoServer mapserver. OpenLayer and GeoExt were used for client application. The cadastral map including spatial and non-spatial data was published through the Internet based on Open Geospatial Consortium (OGC) standards including: Web Map Service (WMS) and Web Feature Service (WFS). The cadastral officers in commune divisions now can use the web browsers, namely Internet Explorer and Mozilla Firefox to access the cadastral data stored and managed in data-tier and server-tier.

CS3-d Geography, Environment and Education II**Sustainable development and climate change: response for education**

by *Kim Chuan Goh*

The issue of climate change has come to the forefront in policy making of governments throughout the world in recent years. This is because governments are now more convinced of the fact and impact of climate change. It has now become an issue of strategic importance as it directly impacts on the sustainability of our planet. While governments are responding quite quickly to this issue, and many nations have drawn up strategic plans to manage and ameliorate these impacts, the response from education has been slow and patchy. How many of the children will grow up literate on this issue is going to determine citizens' role and behavior in combating climate change. This presentation is a summary of how nations respond to climate change and the various environmental issues through education. It is based on the country reports of 10 nations presented at a meeting of the International Alliance of Leading Educational Institutes in Seoul, South Korea, 2009 where the author presented the country report for Singapore.

Sustainable development education in a Malaysian school: greenery or behavioural changes

by *Hanifah Mahat, Mohamad Suhaily Yusri Che Ngah, Shaharuddin Ahmad and Noraziah Ali*

This article evaluated the practice of sustainability among secondary schools in Malaysia, which have been involved with the Sustainable Schools Program Environmental Award (SLAAS). The research attempted to identify the SLAAS effects on teachers' and students' behaviors after direct involvement with the activities of the program. Group sampling technique was used in selecting the school samples while the respondents were selected through purposive sampling technique. The respondents, comprising of 247 teachers and 447 pupils, answered a questionnaire survey intended to evaluate the after-effects of the SLAAS. Document analysis was employed to identify the greening activities that were carried out in the schools involved. The result showed that the schools involved with the SLAAS experienced some transformative effect, especially on greening activities and also on sustainable behavior within the school compound. Based on the correlation analysis, the data showed that there was a significant correlation between teachers' knowledge of the PSSEA and behavior (0.168^{**} $p < 0.01$). Similarly, a significant correlation was also found between pupils' knowledge of the SLAAS and their behavior (0.137^{**} $p < 0.01$) at post SLAAS. The results clearly showed the after-effects of sustainable development education. Hence, SLAAS must be continuously employed in school outdoor activities to educate pupils on how to sustain environmental quality. It is suggested that teachers should be role models of sustainability, not only to the pupils but also to the public.

Influence of school Environment on the Academic Performance of Pupils

by *Raphael Odelola*

This study examined the influence of school environment on the academic performance of pupils. Factors such as school facilities, class size, school location and school plant planning were examined to determine their effects on the academic achievement of pupils. A questionnaire was prepared to test the hypotheses developed. Simple statistics was employed to analyse the variables. Based on the findings, it was discovered

that poor school facilities, large class size, inappropriate school location, and poor school plant planning negatively affect students' academic performance. Recommendations were made to address the issues of school learning facilities classroom population, school location and proper school plan planning.

English education industry and regional employment in Western Visayas, Philippines

by *Jingu Kang*

This study analyzed the evolutionary path and dynamics of the English education service industry in two Western Visaya cities, Iloilo and Bacolod, in the Philippines. Three analysis themes were: 1) the evolutionary path of the English education industry from the 1990s as the nascent period to the present from the perspectives of ownership and governance, the transition of target market, and regional employment in the local context, 2) the alteration of marketing and management strategies effected by IT technology and SNS development and 3) a synthetic analysis about the relationship between regional development and English education industry especially in the value distribution process. In doing so, this study unveiled the development stages of English education industry which was an unknown area until now, and finally suggested areas of future potential and implicit points.

Concurrent Session 4:

CS4-a Special Panel on International Volunteerism and Development in Asia-Pacific II: Roundtable Special Expert Discussion Panel on International Volunteerism and Development in Southeast Asia

by *Sallie Yea and Harng Luh Sin*

This panel is intended to supplement the academic presentations in the panel on Volunteer Tourism and Development in Southeast Asia developed by Dr Sin Harng Luh (Geography NUS) and Dr Sallie Yea (Geography Group, HSSE NIE). We believe that the location of the SEAGA Conference in Cambodia, which has a vibrant NGO sector, including where volunteers and interns are involved, presents a significant opportunity to draw on the insights and expertise of local NGO representatives.

CS4-b Special Panel on Agrarian Change and Rural Development in Southeast Asia II

Java: Coping with high population densities

by *Rodolphe De Koninck*

Very high population densities have for a long time characterized the island of Java. The current average density surpasses 1,100 inh/km², by far the highest in Southeast Asia over such an extensive area (~130,000 km²). Until recent decades, this high population density was largely attributable to rural population and a high ratio of cultivated land, still over 60% of the entire island in the 1990s. Ever since Stamford Raffles in his 1817 History of Java, numerous authors - the most famous being Clifford Geertz in 1963 - have made ominous predictions about the dire consequences of Java's high population densities and the supposedly worsening living conditions they would bring about for the majority of the island's residents. In the first part of this paper I attempted to summarize: 1) these pessimistic predictions and 2) policies adopted by successive

administrations to reduce population pressure while, more importantly, 3) assessing some of their apparent results, with 4 a particular focus on recent processes of urbanization associated with contraction of the agricultural realm and apparent deagrarianization. The second part of the paper contained a critical evaluation of these processes from empirical as well as theoretical perspectives, with the objective of better understanding how Javanese cope with still increasing population densities.

'Taking research to scale': linking local agricultural interventions with scale theory

by *Liana Williams, Rob Cramb and Clemens Grünbühel*

Agricultural research projects in developing countries focus on adjusting farming systems in order to contribute to higher level development goals such as poverty reduction, food security and rural development. The success of these projects and the extent to which they contribute to these goals is tied to the extension of benefits beyond the projects themselves. This process of expansion is referred to as 'scaling out' (dissemination and adoption by a number of people over an extended area) or 'scaling up' (using research insights to inform policy or institutions). While this is an implicitly multi-scale process, the literature on 'taking projects to scale' is largely disconnected from that of scale theory – focusing instead on identifying constraints or success factors for the process. This focus is pragmatic, but leaves more theoretical issues, such as the effect of cross-scale relationships and interactions unaddressed. Through a case study of rice improvement programs in Lao PDR and drawing on theories of scale from human geography and complex systems, we examined the process and implications of taking research 'to scale'. In doing so we traced how the spread of improved varieties in Laos unfolded from different perspectives (from farming household to policy maker) and looked beyond productivity and rice self sufficiency at the broader questions of the role of rice improvement in rural development and how issues of scale have (re)shaped this process.

Rural people in an urban tourism boom

by *Robin Biddulph*

The tourism boom around Angkor Wat has seen a transformation of the urban economy and landscape in Siem Reap and has had a major impact on the Cambodian national economy. Meanwhile, its impact on the people living in rural areas of Siem Reap has been limited, largely because the human and social capital in rural villages are poorly adapted for taking the more lucrative opportunities created by tourism. Previous research on the impacts of tourism on rural livelihoods has focused on the rural population in their home villages. This paper presents preliminary findings of research, which adopts quantitative and qualitative methods in order to learn more about how rural people fare in the town of Siem Reap. This includes the results of a survey of occupants along a tourism oriented street, a survey of stallholders in a tourist-oriented market, and qualitative interviews with rural people who were traced into town having conducted case study research in their home villages. Findings give an indication of the extent to which rural people have found a foothold in the urban economy as land-owners, entrepreneurs or as employees. Difficulties of understanding and evaluating the terms of incorporation into the urban economy are highlighted.

CS4-c Rivers in Southeast Asia: Issues and Challenges

Assessing sediment flux change and corresponding agro-economic impact of Mekong Delta due to mainstream dams on the Mekong River using an Integrated System Dynamics by *Sooyoun Lee and Soojin Park*

Dam construction is a typical way of utilizing river resources such as in retaining water for drinking and irrigation, in mitigating the effects of climate change, and in electricity generation. The Mekong, which has been the only river running to the sea unimpeded by dams through five of six riparian countries, is undergoing hydropower development in the midst of rapid economic growth of Mekong riparian countries. The purpose of this study was to estimate sediment flux change and corresponding agro-economic impacts of mainstream dam construction on the Mekong River. For this purpose, statistical analysis and integrated system dynamics were employed as methods. Cost-benefit analysis was employed to calculate the cost of mainstream dams. In addition, several statistical calculations using t-test, ANOVA and multiple regression analysis were employed in order to understand the past effects of dams on the Mekong River and to test variables for model validation. Several variables such as seasons, Chinese cascade dam construction, and stations were all significant in the creation of the model. Through multiple regression analysis it was shown that Chinese dam construction has a significant effect on suspended sediment concentration in the Lower Mekong Basin with other variables controlled. The multiple regression analysis produced an estimated calculation of suspended sediment concentration data for each station. The possible scenarios of existing Chinese dams on the Mekong mainstream were modelled using System Dynamics Approach. The model showed the same trend with actual sediment load data. In addition, the sediment load showed a decreasing trend after Chinese dam construction but the rate of decrease was 1% which was smaller than that of previous studies. It is posited that the reason for such result was because this study reflected the dynamic feature of trapping capacity of dam reservoirs.

There were a few scenarios that illustrated the impact of future dam construction in the Lower Mekong Basin. According to the results, additional six dams in scenario B will trap 140 million tons of sediments more; three more dams in scenario C will trap 150 million tons of sediments more; and Sambor dam in scenario D will trap 270 million tons of sediments more. The effects of dam construction in the Upper Mekong Basin appeared to be larger than the effects of dams in the Lower Mekong Basin, but distance mitigated the effects of Chinese dams. The net present value of costs of cascade dam construction affecting rice production of Mekong Delta was estimated to be between 1.57 to 4.72 billion US dollars.

This study was an attempt to account for the environmental as well as agro-economic impact related to dam construction. Integrated system dynamics can act as an effective tool to integrate various kinds of knowledge that can enable stakeholders to better understand and take into account the transnational impact of dam construction.

Risk perception and adaptation strategy in the 3S Rivers of Cambodia

by *Kesa Ly*

In Cambodia, the frequency of disasters such as floods has been increasing over the last few years. The impact of droughts and floods are most severe within the agricultural sector which concerns many people as agriculture accounts for around 29% of Cambodia's GDP and 59% of employment. For instance, in 2010, approximately 20,661 ha of crops were reportedly destroyed by drought, flood and insect infestation. In 2011, ;

serious flood affected 279,868 families with damages including 332,634 ha of transplanted rice and 693 ha of rice seedlings in 17 out of 24 provinces in Cambodia. Of these, some 158,447 ha of transplanted rice and 534 ha of rice seedling were thoroughly destroyed contributing to food insecurity in Cambodia, as many people had no rice to harvest in 2011. In 2013, another flood affected 377,354 households and 1.6 million individuals. This flood killed 168 people, mostly children. Some 384,846 ha of rice were affected and 125,011 were damaged. The total loss was estimated about US 356 million dollars.

In this paper we assessed the farmers' perspectives on risk and adaptation strategies in the 3S basin, based on 140 interviews. Having experienced the adverse effects of flood many times, farmers in the 3S basin ranked flood as posing the highest risk while drought came second among livelihood risks. Other risks mentioned by farmers were (1) change in government policy, (2) agriculture input vis-à-vis price fluctuation, (3) agriculture output vis-à-vis price fluctuation, (4) shortage of irrigation, and (5) migration. The perceptions of farmer about the level of risk were closely linked with their adaptation strategies. If risks were perceived as low, no action was taken to cope with the risk.

The people were worried of potential disaster reoccurrences as the frequency of floods and droughts has been once per two years or twice per three years over the last decade. The participants observed that the government pays more attention to floods compared to other disasters. The research showed that most farmers (88%) got support from government and NGOs in events of flooding in the forms of food rations, hygiene package, and crop seeds. However, because this support only lasts for a short time, it does not compensate all impacts of the flood. Thus, families need to apply their own adaptation strategy such as moving to higher ground during the flood and selling labor after the flood. Sometimes they have to borrow money from MFI or local moneylenders to recover from the flood damage. This study provided evidence that the ongoing climate change programs initiated by NGOs and government alone cannot help farmers recover from the impact of floods. We argue that the government should improve its programs to help farmers cope with floods, droughts and other risks.

Multi-scale flood vulnerability assessment of agricultural production in a context of environmental change: the case of Sangkae River watershed, Battambang Province, Cambodia

by *Sotheavin Doch, Chinda Heng and Jean-Christophe Diepart*

Flooding on Cambodian land use systems is not a new phenomenon but its significance has increased in the context of global environmental changes. This study assessed the vulnerability of agricultural production to floods in the Sangkae River watershed in Battambang province, Northwestern Cambodia. The study was conducted in conjunction with the provincial spatial planning team hosted by the Provincial Department of Land Management and can be viewed as a first step towards a flood management decision-making tool for provincial authorities.

The assessments rest on specific dimensions of vulnerability (exposure, sensitivity and adaptive capacity) at different levels in a multi-scale framework: spatial scale (watershed, commune and household), temporal scale (decade, year and season) and institutional scale (national policy, provincial operating rules and communal agencies). The analysis rests on triangulation of qualitative and quantitative data which include time-series rainfall data, land use systems, participatory flood mapping commune workshops (n=31), socio-economic statistical databases, in-depth interviews with relevant institutions (n=5) and household surveys (n=162).

The results showed that the intensification of rainfall since the 1920s has increased the risk of flooding in the Sangkai River watershed during the late rainy season, particularly in the upstream area. Using an indicator-based approach, we discovered that the vulnerability of communes is highly dependent on the agro-ecology of land use systems. The household assessment revealed the variability of adaptive capacity between households according to their food security status and income portfolio. Agricultural innovation and structural adaptation to flood are scarce; the households mostly cope with flood through credit, external aid and de-capitalization (sale of household assets). These coping mechanisms adopted by farmers do not reduce vulnerability but reinforce it.

The application of this assessment methodology provides nested pictures of vulnerability at different levels and scales. We argue that a dialogue between these levels and scales is necessary to understand the nature of vulnerability and to act to reduce it. Using these different typologies of vulnerability, this approach enables for the formulation of recommendations to reduce vulnerability through better horizontal and vertical integration of institutions and agencies, and effective collective action.

CS4-d Climate Change Discourses

You don't know what you don't know: Singaporean youth's misconceptions about climate change

by *Chew Hung Chang and Liberty Pascua*

Climate change remains a misunderstood phenomenon despite its prominence in social and political discourses and its inclusion in various courses within environmental and geographic education. In fact, the literature attests to the prevalence of misconceptions in common knowledge about its causes, processes and impact across research contexts. This case study from Singapore documented the nature of flawed conceptions held by secondary school students about climate change. Data was collected through individual and group semi-structured interviews from 27 students who have previously studied the topic in lower secondary school Geography. Using Chi and Roscoe's (2002) distinction of mental models, it was determined that the research participants' understanding was typified by incomplete and incorrect concepts built within coherent and structurally sound mental models. Due to the consistency of the models in expanding the perceived logic of explaining the climate change conundrum, the authors put forward that the students were unaware of mistakes inherent in their conceptualizations. Further, the evident gaps in the students' mental models post-instruction attest to the resilience of misconceptions. Based on the mental models identified, recommendations were presented in designing effective pedagogical approaches to correct common and resilient climate change misconceptions.

Adaptive capacity to flood of communities in North Central Vietnam: case studies in Yen Ho commune, Duc Tho district, Ha Tinh province and Hung Nhan commune, Hung Nguyen district, Nghe An province

by *Phuong-Thao Nguyen, Thi-Ha-Thanh Nguyen and Quang-Huy Man*

North Central Vietnam is one of several areas that are severely affected by climate change-induced water disasters like flood, drought and salinity. Among these events, flood is the most typical disaster, which negatively impacts the region and its people annually. This paper investigated the effects of water disasters and analyzed the adaptation strategies of affected

communities in the Central provinces. In doing this, the Climate Vulnerability and Capacity Analysis methodology (CVCA) of CARE organization was employed in addition to household surveys. The Hung Nhan commune in Nghe An province and Yen Ho commune in Ha Tinh province, two communities separated by the Lam River, were selected as study areas since they are localities often affected by flood. The results showed that although the two areas are normally flooded due to heavy rains, the underlying cause of flood in each commune is different. While the former is outside the dyke and suffers flood due to the overflowing of the Lam River, the latter is inside the dyke and endures inundation due to poor drainage. Thus, Hung Nhan is more physically vulnerable than Yen Ho due to its location. Capitals of livelihood of people in Hung Nhan are also not good as that in Yen Ho. Not surprisingly, poverty in Hung Nhan is more prevalent in comparison with Yen Ho. Through bottom-up approach, the paper found the differences in adaptive capacities of the communities and identified top priorities in each community that need to be addressed to increase their adaptive capacities. Suggestions were put forward for the development of an appropriate adaptation strategy in these communities.

A preliminary study on implication of changing climate on food security: case study in Kota Belud, Sabah

by *Abdul Razzaq Bakri, Ramzah Dambul and Yasmin Ooi Beng Hui*

Climate change poses serious threats to agriculture and food security in the 21st century. Some studies have shown that climate change affects food production directly through changes in agro-ecological conditions and indirectly by affecting growth and distribution of incomes. The global food crisis in 2008 had been a wake-up call for everyone as world food prices spiked more steeply than in the last 30 years. This was evident in the rice price situation in the period of 2004 to 2008. In this study, the relationship between climate change and food security was explored to assess the former's impact on crop productivity and hence, food production. This article reviewed the vulnerability of food security in relation to climate change in Kota Belud. The Radimer/Cornell hunger scale was used to measure hunger and food insecurity in the area. Data was collected through survey forms distributed to 251 residents. Further, chi-Square tests were used to determine any correlation between the farmers' perceptions of climate change and food accessibility. The results have shown that climate change has no significant correlation with food accessibility. Even though all of the four elements of food security seemed to be affected by climate change, there are also emerging and ongoing forces that have effects on food security such as economic growth, changes to trade flows, stocks, and food aid policy.

Farmers' perception of climate change in semi arid zone: a case study in XinJian and Zhangga Villages, XunHua County, Qinghai Province, People's Republic of China

by *Firuz M, Ibrahim Nather Khan, Ma Fu, Zhang Ming Ming, Huang Juncheng Juncheng, Xu Jianlong Jianlong, Ma Yuzhen Yuzhen, Zhang Shihua and Wu Qian Qian*

Climate change is a change in the mean and/or the variability of the climate's properties that persists for an extended period of time, in at least a decade or longer. Climate change may be due to several factors such as natural processes, external forcings, or persistent anthropogenic changes in the composition of the atmosphere as well as drastic changes in land use pattern (IPCC, 2012). A changing climate would lead

to alterations in the frequency, intensity, spatial extent, duration and timing of unprecedented extreme weather and climate events. The objective of this research was to determine the perceptions of farmers in two villages in XunHua County of Qinghai Province, China of climate changes and its implications to their farming activities. Meteorological data showed evidence of changes in the climate of both Xinjian and Zhangga villages. For the last 20 years, the recorded mean rainfall had declined while mean temperature significantly increased. Data for this research was collected using a mix of qualitative and quantitative methods. It was found that the farmers were aware of climate changes. For instance, they observed that the number of “planting days” was getting shorter. The farmers expressed worry about the decline in their farm’s overall production and quality of produce. In addition, it was perceived that the cost of living in the villages was increasing and farmers’ income has now become “just enough” for their basic food and clothing needs. The usage of chemical fertilizer did not result in better production but only increased the cost of operation.

Concurrent Session 5:

CS5-a Geographies of Agriculture

A comparison of rubber smallholder livelihoods in Cambodia and Laos

by *Edo Andriesse*

Amidst complex developments in the Greater Mekong Subregion (GMS) selling latex, which is tapped from the rubber tree, is becoming a major agricultural activity. However, large scale rubber plantations in Cambodia and Laos have been associated with several negative phenomena such as land grabbing, exploitation through contract farming, increasing rural poverty, economic and technological dependence on foreign investors and environmental degradation. Henceforth, there is a need to focus more on smallholders as rubber smallholdings provide employment and do not lead to landlessness. This paper compared rubber smallholder livelihoods in Cambodia and Laos and investigated the extent to which rural communities can benefit from the rubber boom and improve their livelihoods. This was done through a case study of smallholders in Tboung Khmum district in Cambodia and Bar Somsanouk in Laos. Three bodies of knowledge informed the empirical analysis: micro-livelihoods studies, global value chains and the now substantial academic inquiry on GMS corridors. The empirical focus of the research was on livelihoods’ trajectories and outcomes; that is, employment generation and poverty reduction. Overall, rubber smallholdings appeared to be promising, yet given existing challenges, rubber cannot be considered a cash crop that will solve all rural hardships. An important similarity between the two locations observed was the socioeconomic contribution of rubber smallholdings. In both research areas, smallholders argued that growing rubber trees is a good way to increase living standards. The clearest differences were related to the upstream value chain, intercropping and social capital. While the Tboung Khmum smallholders sell latex to middlemen, the Bar Somsanouk smallholders sell latex collectively to the highest bidder although the price follows the international price trend. In addition, there is an absence of intercropping in Bar Somsanouk. Investors who wish to maximize yields therefore do not advise smallholders to intercrop. Finally, smallholders in the Cambodian case sometimes cooperate, whereas there is little cooperation in the Lao case. Although many results seen applicable for other accessible parts in central and northern Laos as well as Cambodia, the collective selling process in Bar

Somsanouk and the relative small average landholdings in Tbuong Khmum are village specific. The research results give rise to three policy implications in the spheres of value chain governance, intercropping and microfinance.

Conservation enclosure and the rise of the rubber boom: adopting rubber cultivation to upland Thailand

By *Autsadawut Mongkolkeaw*

Research over the last three decades on the cultivation needs of upland people has contributed to two schools of thought: one that positions upland people in relation to the state in addressing environmental issues, and another that depicts upland people as victims of development. However, neither theory explains the patterns of crop cultivation practices of ethnic people after the adoption of rubber cultivation. This research is a case study of rubber cultivation and the roles of different actors such as the state, local administrators, and NGOs who are involved with upland cultivation after the Civil War period. The shifting relationship between the state and the Hmong through upland landscape dynamics and upland economics over the past three decades were examined. The study applied Massey's concept of "relational space" to explain agricultural production mechanisms used to control land use in the area.

The findings indicated that the use of consultative rather than punitive methods has been effective in encouraging the Hmong to change their patterns of cultivation from unrestrained slash-and-burn practices to more controlled burning. Other institutions support the Hmong adoption of rubber as a tool of conservation. The study asserts that rubber cultivation in the upland area has economic, political and cultural dimensions. The upland area is not only a physical space that engages the Hmong and the state authority but also attracts their relatives who have moved to other countries, such as the USA and Australia, since the Communist era.

Value chains and the Middle Income Trap: the case of the sugar industry in Northeastern Thailand

by *Dennis Choi and Edo Andriesse*

Thailand had successfully accomplished economic development in the past decades. Rapid growth that started in the early 1980s led to Thailand becoming one of the leading economies in Southeast Asia. However, this development trajectory is questioned in various perspectives. One such critique is the Middle Income Trap proposition. This study attempted to interpret the Middle Income Trap through different perspectives.

The Middle Income Trap is usually adopted to explain certain macroeconomic issues of a country. Through looking at a regional disparity, this research scrutinized the situation in Northeastern Thailand, an area considered as one of the most underdeveloped region in the country. Specifically, the sugar industry of the region was used to analyze how the features of the Middle Income Trap are manifested in the region's industry and economy. To expand discussion on this subject, the Global Value Chains framework was adopted. Specifically, this study focused on the upstream sugar value chain and analyzed the relation between sugar cane farmers and millers. Fieldwork was performed at the sugar cane fields, rural villages and weighing stations of Khokpochai and Manchakiri district of Khon Kaen province.

Results showed that based on observations of upstream sugar value chain, the system can be termed as 'state-led markets value chain'. The price is highly controlled by a government body, and unlike 'markets value chain', the price cannot be a proper signal to the agents involved. In addition



the upstream sugar value chain shares several aspects of the Middle Income Trap: low level of investment and R&D activities labor shortage and weak institutions. Several implications are described for these problems within the value chain and for regional development. Even though this study cannot offer generalized views, it is meaningful to 'think' of the Middle Income Trap not on a national scale but also through regional and industrial contexts.

CS5-b Natural Hazards

A proposed evacuation plan/map for residents of Barangay 843 – zone 92 in Pandacan, Manila in case of geohazard episodes

by *Timothy James Cipriano and Enrico Garcia*

Geographically, communities in the Philippines have become more vulnerable to hazards as the country is exposed to these catastrophic events every year. Recently, super typhoon Yolanda (international name Haiyan) and a 7.8-magnitude earthquake wreaked havoc in the provinces of the Visayas region that left thousands of casualties and billions of pesos worth of damages. These circumstances have led to gradual paradigm shifts in disaster response. Individual experiences and community collaboration and efforts help shape disaster risk reduction management (DRRM) practices through organized and coherent actions of mitigation against geohazards in the future to promote environmental sustainability. One such practice is evacuation. This research looked into the evacuation practices of a community in Pandacan, Manila Philippines. The researchers utilized a descriptive method specifically fieldwork survey to describe the residents' experiences of hazards and their evacuation practices as a way to prepare and mitigate the effects of hazards to their community. The implication of these findings served as the basis for the proposal of an evacuation plan for the residents in case of geo-hazard episodes. These long-term mechanisms are very much needed to build communities that are disaster resilient and capable to adapt under hazardous circumstances.

Agricultural impact of cold lahar flood of Kelud Volcano eruption in 2014: a case study in Konto watershed, Ngantang, Malang

by *Adelina Chandra, Diah Rossy Pratiwi and Noer Sulistyarini*

Kelud volcano is of the stratovolcano type. Intense explosions in a short time span characterize its eruption. Kelud's eruption in February 2014 resulted in a cold lahar flood in the Konto Watershed (DAS), Ngantang, Malang. The flood caused damage and loss of agricultural activity in the affected areas. This study aimed to determine the level, characteristics and amount of loss in agriculture due to cold lahar flood. The Economic Commission for Latin America and the Caribbean (ECLAC) method was used to determine the extent of damage and loss prediction of farms. The spatial analysis used an overlay method in which three variables were involved to determine the characteristics of farmland damage: distance from river body, distance of agricultural land from the river bank and slope. Field observations were also done to obtain zoning data of agricultural land that suffered damage. The analysis showed that heavy damage were at a distance of 100 meters from the river body, flat to gentle slope and has a height range of less than 12.5 meters from agricultural land to the foot of the river valley. As for the prediction of total loss of agricultural enterprises, damages reached Rp5, 587, 451, 051.00 for rice farming and Rp 3,135,280,565.00 for non-farming paddy respectively.

Flood inundation mapping: a case study of Jakarta floodby *Kuswantoro Marko, Eko Kusratmoko and Amro M. Elfeki*

Floods pose hazards to society, the environment and the economy. For instance, the flood in Jakarta on 15–23 January 2013 resulted to blocked roads, forced businesses in the capita to close and displaced at least 20,000 people. This research estimated the flood hydrograph and delineated the flood inundation in Jakarta City for this specific event. Different conditions of return period of the storm and the curve number (CN), which deals with land use changes, were used to obtain several scenarios for the flood inundation maps. A hydrologic model based on topographic and drainage characteristics (generated from DEM), precipitation (constructed from real time global rainfall data TRMM data in 3-hour increments), and land use/soil properties was generated. Ultimately, utilizing HEC HMS produced the hydrographs. These new techniques were utilized to identify inundated areas using a coupled Watershed Modelling System (WMS) - HEC-RAS, and GIS approaches. This study is useful for the government in investigating potential flood-vulnerable areas and in ensuring the safety of human lives from flood hazards.

CS5-c Geography, Environment and Education III**“Wicked” problems in teaching geography: Singapore teachers’ perspectives of climate change education**by *Tricia Seow and Li-Ching Ho*

“Wicked problems” (Morgan, 2006) are difficult to define, are contested and have no clear-cut answers. Studies have shown that teachers face numerous intellectual and emotional challenges when handling “wicked problems” in the classroom (Hess, 2009; Oulton, Day, Dillon, & Grace, 2004), yet relatively few studies have examined how teachers’ perspectives on potentially controversial issues related to climate change education are affected by socio-political milieu. This qualitative study, therefore, aimed to address the important gap in knowledge about the ways in which educators navigate a complex agenda comprising personal beliefs, student needs and various social and political forces that frame their teaching of climate change.

The data consisted of semi-structured individual interviews of six Singapore geography teachers, purposefully selected from both regular government schools and independent schools. The interview protocol comprised questions and an elicitation task that included different climate change perspectives.

Findings revealed that in spite of the prescriptive curriculum and the dominant national discourse supporting climate change, Singapore teachers adopted diverse pedagogical positions thus indicating that geography teachers play an important role in mediating geographical knowledge for their students in spite of contextual constraints (Morgan & Lambert, 2005). The study also raised the issue of how climate change education is differentiated for students from different academic tracks, with teachers approaching climate change as a “wicked problem” only for those they deem more academically able.

Survey of environmental knowledge, attitudes and behaviour of students and student teachers in Singaporeby *Ivy Tan and Qiu Fen Jade Chen*

In 1996, the first author conducted a baseline study on secondary and junior college students’ level of environmental knowledge, attitudes and behaviour in Singapore. The present study is to report on a similar study, which was conducted in 2012. In this round of the research, a group of pre-service student teachers were included in the sampling pool of the



survey. The main objective of the present pilot study is to assess and compare the environmental knowledge, attitudes and behavior of students and pre-service student teachers in Singapore by collecting empirical data through the use of a revised and updated survey questionnaire. All the questions from the 1996 study were used and more questions were added so as to reflect more accurately current societal attitudes and environmental concerns, especially those on climate change. The revised questionnaire was tested on a total of 138 students (Secondary 1 = 83, Secondary 3 = 55) from one secondary school and 91 student-teachers (Bachelor of Arts Programme = 61, Post Graduate Diploma in Education Programme = 30). The relationships between the respondents' environmental knowledge, attitude and behaviour with socio-demographic variables such as gender, age, ethnicity and residential type were evaluated. This paper will present the results of the validation of the revised items in the survey questionnaire, the computed descriptive statistics and analysis of variance.

Different strokes for different folks: a critical commentary from the viewpoint of a teacher advocating differentiated instruction when conducting Geographical Investigation
by *Frances Ess*

With the inclusion of Geographical Investigation (GI) in Singapore's revised Geography Syllabus for secondary school education in 2013, a set of teaching and learning guide and a corresponding teacher in-service training programme to prepare teachers to teach GI was introduced. While the teaching and learning guides provided guidelines and resources for GI, the question of whether the activities carried out were at the expense of differentiated instructions for different students' learning needs arose. Just as the 'one size does not fit all' analogy, the experiments suggested in the textbook may not be suitable for all students. The idea of considering differentiated instruction to accommodate different ways that students learn is an approach that requires active planning.

This presentation aims to present a critical comparison of two approaches that have been carried out with GI. The first is the "Command and Control" approach where teachers help and guide the students in designing the Key Question, the hypothesis and the experiments to be carried out in a GI. The second is the "Collaboration and Chaos" approach where students are allowed to form their own Key Question hypothesis, and their own experiments. Both approaches have their benefits and limitations to support student learning. Finally this presentation intends to encourage geography teachers to try different approaches when tackling GI, while reflecting on how these modes will support student learning.

Engaging in disaster education: building disaster literacy and preparedness in the Philippines
by *Hiroko Nagai*

In 2013, Typhoon Haiyan, the strongest storm recorded a landfall in history, hit the Philippines. While its severity and intensity shook the world, the country was aware that the typhoon was not an exceptional disaster event; rather, it was viewed as a phenomenon that may recur more frequently with climate change. Aside from loss and damage, one of the issues raised was faulty hazards communication particularly the use of the term "storm surge." The early warning of storm surge did not work when it was supposed to help people evacuate from coastal areas. Notably, the people did not understand "storm surge" because there was no exact equivalent word in Philippine languages of the term, and the public did not

commonly understand the English scientific term. This scenario highlighted the urgent need for disaster education in society. At the same time, it also prompted the academe to recognize the need for the translation of scientific knowledge into the vernacular as well as the importance of empowering people to take action. Nonetheless, no educational institution in the Philippines has created any comprehensive disaster education program and dismal efforts to tackle the issue remain fragmented. Having this situation as the background, this paper is an attempt to theorize the pedagogical approach in disaster education as a framework by examining its application to the local conditions, and by exploring the role and issues of higher education. The methodology included extensive review of practices of disaster education in different institutions in addition to a case study of a disaster preparedness workshop created by a citizens group based on reported experiences of the 1995 Great Hanshin Earthquake, which is in the process of localization. Disaster education programs usually contain three components: scientific knowledge on disaster, competence and skills for problem-solving and survival, and value formation. In relation, this paper considered the significant role of three dispositions in curriculum making for climate change: hope, imagination, and engagement with place as suggested by Barlett and Stewart (2009), with the goal of linking knowledge with action. Action requires individuals to embrace the problems of climate change and the consequent disasters, and seek solutions. The study underscored the importance of localization of disaster education in order to reach and empower affected individuals.

CS5-d Environmental Challenges in Southeast Asia II

From dipterocarpus forest to rubber plantation

by *Sekson Yongvanit*

This study describes the change of land use from dipterocarpus forest to rubber plantation of Dong Mun National Reserved Forest (DMNRF), Kalasin Province, Northeast Thailand. It attempts to understand social and environmental changes including migration, cash crops, government policy, and globalization.

DMNRF was mostly a dipterocarpus forest with a small area covered by tropical rain forest. Around 1830, the first group of people migrated to DMNRF because it was a very dense forest with fertile soil. At that time, there were many animals such as wild pigs, deers, and monkeys that call the forest a home. Moreover, due to population growth, drought and flooding in other provinces, many more continuously migrated to this area.

In 1952, a forestry company acquired a concession from the government to cut trees at DMNRF. In 1963, Lam Pao dam was constructed and the people affected in the lowland area migrated to DMNRF. To protect the forestland from illegal migrants, the government provided land for farmers and set up land rights programs. In 1967, cassava was introduced as a new cash crop while sugar cane was introduced in 1971 in addition to traditional crops of rice, upland rice, chili, tobacco, cotton, jute and corn.

Nowadays, the forest merely covers the mountain and 30 % has been reforested with eucalyptus and teak. Rubber plantation is dominant on the hill and the slopes, covering more than 70 % of total land area. Due to increasing sugar prices, sugar cane plantations expanded to the lower slope in place of cassava plants.

Regarding forest conservation, there are now 25 villages supporting the community forest groups in participating with forest temples to set regulations such as disallowing the cutting of certain trees and the imposition of restrictions to bamboo and mushroom gathering only for self-consumption. The most important aim is the prevention and control of wildfires. The

participation of the public is an important factor that can sustain forest resources. It is a collective belief that in the future, this area will be back to being green again.

Geographic Information Systems application to estimate the level for flood vulnerability around Code River, Yogyakarta City

by *Janu Muhammad*

The Code River in Yogyakarta City, Indonesia experiences siltation due to the accumulation of materials washed downstream from Mount Merapi during the rainy season. This renders the river shallower each time, thus, making its vicinity more vulnerable to flooding. The purpose of this study was to determine the level of flood vulnerability and to ascertain the distribution of river flow around the Code River using Geographic Information System applications. The study's independent variables included the following: land use, slope and embankment slope, soil texture, rainfall, distance to the river settlements, width of river, and land forms. The researchers employed quantitative techniques by utilizing secondary data and processing of input data to produce output in digital mapping. Scoring against the independent variables was used for data analysis. The vulnerability analysis of the river was calculated starting from the lowest score to the highest. The resultant figure was then used in the application of Geographic Information System through the overlay method which was utilized in the process of pooling data from different layers of the layer. Based on the scoring and overlay, the data showed that the highest score was 16 while the lowest score was 10. Scoring the results indicated that the class of flooding was not susceptible (≤ 11), the potential of being the class interval was 12-13, and the high potential class was ≥ 14 . Areas along the river were of medium to high level of vulnerability. In addition, it was noted that the area along Code River is dominated by settlements, which further increases the vulnerability to flooding. It is posited that green and open spaces should reduce the area's vulnerability to flooding.

Mapping the reduction of active sand dunes area as natural heritage in Parangtritis Coast, Yogyakarta

by *Isna Pujiastuti, Fithrothul Khikmah, Galih Dwi Jayanto and Muh Aris Marfai*

The only sand dunes in Southeast Asia are found in the coastal area of Parangtritis, Yogyakarta, Indonesia. This landform is very unique, because unlike most sand dunes in arid regions, it is located in a humid area with average annual precipitation of about 3342,2 mm. This unique landform has many important roles to the local environment as it serves to protect the coast from erosion, acts as a buffer for potential tsunamis, acts as an ecosystem's control and as storage of fresh water. Increasingly, the sand dunes have been reduced and this has caused the physical landscape to change consequently impacting the environment. The main objective of this study was to evaluate the changes to active sand dunes area from 2000 to 2012 using multi-temporal remote sensing data. It was observed that the area decreased due to vegetation from plantations and rapidly increasing settlement in nearby coastal areas. Vegetation reduces the wind's effectiveness to transport sand that forms sand dunes. In addition, human settlement also acts as barriers to active sand dunes movement. The findings that rapid land use changes sand dune areas is a contribution to valuable information needed in developing conservation strategies for the only sand dune landform in Southeast Asia.

Concurrent Session 6:

CS6-a Special Panel: Sustainably Managing Water Resources in an Urbanizing World

Hydrological resilience in a climate changing world: a case study of the extremes in Singapore

by *Kim Irvine and Chew Hung Chang*

In February and March 2014, more than 300,000 households were affected by water rationing in Kuala Lumpur and the surrounding Selangor area in March 2014. Further south, reservoirs were drying up in Singapore, prompting the government to raise the water conservation rhetoric. The region experienced a dry spell that was unprecedented in the last 30 years. Preparedness for storms has been the "talk of town" since the 2001, 2006 and 2007 extreme high precipitation events in the southern parts of the peninsula and in Singapore. However dry spells invoke equally valid concerns over the impact of such hydrological extremes on our economy and livelihood. Interestingly, while Singapore relies in part on buying water from Malaysia to meet the city state's residential, commercial and industrial needs, it did not need to resort to water rationing, and in fact had sufficient water supply to tide through the event. In recent published literature on climate change adaptation, the region has been responding to storm hazards that brought extremely high precipitation more frequently. While resilience has been a concept used frequently in climate change adaptation, it is derived from ecology, where it refers to the capacity of the system to respond to a disturbance and resist the impact or recover from the damage of the disturbance. This paper will examine the case of Singapore as a large urban area in responding to a similar extreme hydrologic phenomenon by examining the climate change resilience of the small city-state. In particular, the paper will review the rainfall extremes over the last 30 years; examine the impact of previous storms and the dry spell in March 2014 and discuss the aspects of resilience that can serve as lessons for tropical cities in future adaptation to extreme hydrologic events in a climate-changing world.

Impact of urban wastewater on water quality of the lake at Rach Gia Bay in the Mekong Delta, Vietnam

by *Long Trinh Thi, Chuong Dang Minh, Vinh Pham The and Chinh Duong Cong*

The Mekong Delta of Vietnam is facing the impact of climate change and sea level rise. Two extreme weather conditions - drought and flood - have occurred much more often recently. Faced with the challenges of drought, the government of Vietnam constructed a super sea dyke (SSD)/barrage at Rach Gia Bay - Kien Giang province to create a fresh water lake that will supply water to water scarce regions in the Long Xuyen Quadrangle (LXQ) especially the Ca Mau Peninsula (CMP). Three options for the SSD have been proposed: (1) short route 30 km, creating a small lake with a surface water area of 357 km² and a volume of 609 Million m³; (2) short route track, 31.8 km, creating a lake with a surface water area of 425 km² and a volume of 795 Million m³; (3) long route, 47.5 km, forms a large lake with a surface water area of 823 km², 2.58 billion m³ in volume. Furthermore, each option includes at least a sluice gate and a navigation lock.

The total load of pollutants (TSS, BOD₅, COD, total nitrogen total phosphorous) and capacity of the lake to absorb pollutants has been calculated for the optimal option. The results showed that the wastewater from Rach Gia City, if left in its untreated form, can make the lake become wastewater repository.

especially for organic pollutants, as it will receive a total wastewater volume of 28,432 m³/day.night from domestic sources and 16,711 m³/day.night from industrial sources. The total load of TSS, BOD and COD will amount to 25,482; 12,281 and 21,074 kg/day.night respectively. MIKE 21 Flow Model FM was used to simulate and evaluate water quality of the lake considering different methods/modes of discharging treated wastewater into the lake. The results showed that even though wastewater might be treated to meet the standards of Vietnam (Class B), the lake will still become contaminated locally. Modes of treated wastewater discharge at 1 point or 5 points near the bank or even at the middle of the lake do not help to ensure uniform water quality in all areas of the lake. An optimal option proposed is to control water quality not only for Rach Gia City, but also for other rivers and canals which are flowing to the lake to improve the efficiency of water supply for different purposes.

Worlding Hyderabad and its liveability and sustainability challenges

by *Diganta Das*

Asian cities are becoming increasingly entrepreneurial through learning from each other and aspiring to be global or world city. In this process of worlding, elites from around the world are being invited to be part of this neoliberal transformation; poor locals are getting pushed to the margins far from the city boundaries. Hyderabad in India provides an interesting account of this trend of neoliberal development: where local poor farmers are pushed out from their land to make way for a world-class knowledge corridor, popularly known as Cyberabad. The processes of worlding have also impacted the larger environment and sustainability issues of the city – from encroaching lakes for real-estate developments to privatizing the water provisions. Through the lens of dynamic change in the city's waterscape, this paper examines the grounded realities of Hyderabad's global aspiration and the ways it impacted the liveability and sustainability processes and water provisions for the locals.

East Calcutta Wetlands: introducing new areas of learning

by *Dhrubajyoti Ghosh*

Unusual things happened since the middle of the last century beyond the bounds of the city limits to the east of the then Calcutta. A new worldview was emerging: a worldview or community-based wastewater management system. Wastewater, textbooks always say, is a pollutant. The fish farmers and fish producers in the East Calcutta Wetlands imagined it differently. They were collecting their experience from a practice of growing vegetables on meticulously stripped mounds of city garbage and irrigated by settled wastewater also from the city. Their remarkable knowledge in ecology and their spontaneous urge to live creatively with nature led to the formation of wastewater fishponds, locally known as *bheris* now known all over the world for their ability to influence the ecological history of Calcutta. In this paper we will introduce ourselves to a few prominent areas of learning ecosystem management from the fishery practices mentioned above.



CS6-b Issues in food production I

Weighing costs, weathering risks: adaptive strategies of fish farmers facing multiple risks in Northern Thailand

by *Santita Ganjanapan*

Numerous studies on adaptive strategies focus on how actors make use of different capitals to handle livelihood challenges but only a few investigate how actors think about strategies that will cost them in terms of time, capital, and labour as well as how actors mix strategies in time, space and scale to suit each challenging situation. This paper examines how fish-farming communities adapt to climate variability, market uncertainty and management intervention, which have impacts on their livelihoods. Conceptualising adaptive strategies as practice, the author classified strategies into different groups including strategies to protect farm productivity, to improve livelihoods and to manage common-pool resources. Strategic thinking processes were also classified into three options: thinking about experimental costs, thinking about economic costs and thinking about social or transaction costs. Farmers' decision processes were studied at household and community levels. Peri-urban farmers from Ping and Ing river basins in northern Thailand were compared on the basis of their classification into fish farmers, crop-and-livestock farmers and non-farmers even though most of them hold both farm and non-farm occupations. Data was collected through in-depth interview, focus group interview, participant observation and field survey throughout the cool, hot and rainy seasons from January 2013 to May 2014. Data analysis was done through the aid of qualitative data analysis software. It was found that individual farming households when exposed to multiple risks choose strategies which minimise experimental costs in terms of money, labour and time. They will maximise all available resources while generating new knowledge on adaptation. Most small-scale farmers choose this option. If unsuccessful, they will shift to strategies, which minimise all economic costs. Large-scale farmers tend to choose economic cost minimising option whereas medium-scale farmers opt for a mixture of both experimental and economic costs. Nevertheless, when threats are related to common-pool resources, which are beyond individual control, farmers turn to collective strategies that come with social costs or transaction costs. They have to mobilise and negotiate with other stakeholders at multiple scales to find solutions to such problems as water scarcity, water pollution and riverbank collapse. Collective-action problems reveal emerging needs to develop and strengthen institutions for managing rivers and state-led irrigation systems as common pool resources.

Fish farmers' utilization of social networks to adapt to drought and water pollution in Upper Northern Thailand

by *Weerakan Kengkaj*

Many scholars view social capital as an important element for adaptation to climate change. Less attention has been given to understanding power relations among resource users connected through social networks. The paper focuses on how social networks are utilized during time of climate-related and socio-economic stresses. Bridging, bonding and the notion of reciprocity, trust and collective action provide a framework for examining relational power. It comprises the different interactions among different scales of agency on collective access to resources. The study was conducted in three villages in three provinces of upper northern Thailand (Chiang Mai, Chiang Rai and Phayao) with different levels of access to water resources, and degree of urbanization. There were 30 case studies of fish farmers and 16 key informants from government

department of fisheries, universities and feed companies. In each village, these farmers were classified into three groups such as large, medium and small operators and those who have exited from fishpond farming. Households and village communities were the units of analysis. Information was collected through participant observation and semi-structured interviews. To understand the historical hydrological and meteorological drought, the time frame of the study traced back over the last 10 years. More detailed and immediate information was collected in all seasons during 2013-2014. The qualitative primary data was triangulated with the secondary data and GPS maps of drought exposure.

Findings revealed that water scarcity and conflict were previously observed rarely as a consequence of the strong irrigation management system, less demand from other uses and less market influences on agriculture and aquaculture production. By contrast, water level during summer and winter in 2013 and 2014 became obviously lower than in earlier periods. The problem was exacerbated by variability or change in climate, increased demands for water and the lack of collective action among water users in maintaining the irrigation system. Well-off local authorities and large fish operators expanded their fishponds to upstream, stocking water without sharing and releasing polluted water downstream. Villagers and other farmers including fish farmers downstream, as a result have reduced access to good quality water and conflicts ensued. Farmers cannot continue their rice and cash crop farming during the dry season. Fish farmers also encounter poor water quality, which results in fish death and fish diseases. In the area with high social networking, these problems urge large, medium and small fish farmers to collaborate and negotiate for water access with irrigation leaders and upstream fish farmers. The study showed how social capital with high interactions among agents active at different scales can support adaptation to water-related stresses and thus should be useful in dealing with future climate variability and change.

Fish-farming household burdens, mobility decisions and multiple vulnerability reduction in the Ping River Basin, Thailand

by *Phaothai Sin-Ampol*

Mobility, which encompasses population, remittance, material and symbolic flows, is generally recognized as resulting from jointly made decisions of mobile and sedentary household members. Out-migration of many rural Thai villagers challenges the conventional understanding of communities as self-sustaining, and cooperative neighborhoods, replacing the concept with an image of a community relying upon external jobs, money, work experiences, and social networks. The relationships between mobility and climate-related and socio-economic disasters have begun to receive more attention from researchers. Only a few studies have considered mobility effects in households engaged in aquaculture and none of these have looked in detail at how remittances may support adaptation to multiple vulnerabilities. This presentation investigates how mobility decisions in the past and the present are related to household burdens including household structure, occupational diversification, and access to financial, social, and cultural capitals. The analysis also examined how fish cage farmers are vulnerable to climate-related and socio-economic risks prior to mobility decisions. Qualitative methods were used including in-depth semi-structured interview of 42 fish cage farming households in four villages in upstream, midstream and downstream sections of the Ping river basin with different physical climate-related risks, production sizes, and household burdens to compare between pre- and post-fish farming periods.

The findings indicated that 95 percent of households have a least one member out-migrating and seeking job opportunities. The expectation is that mobility will help meet daily living needs, build long-term foundation of life, and provide money in fish farming and other farm and non-farm activities. Age dependency status, numbers of household members, gender education, household division of labor, and occupational structures influence mobility decisions. The convergence of those factors can spatially and temporally facilitate or obstruct decisions to accumulate and develop financial, social, and cultural remittances.

Fish cage farming, meanwhile, requires that sufficient cares is provided for, implying demands on household time and labor. After starting fish farming and being exposed to multiple risks, household decisions to move as an adaptation are based on household and occupational structures, social networks, and working experiences. It is found that mobility enhances household capacities to absorb climate-related and socio-economic risks arising as part of fish cage farming in various ways. For example, fish farmers who commute for daily jobs in nearby communities or do other non-farm jobs within villages can adapt better in terms of providing means for daily livings, or earning massive funds to absorb production failures. Single-generation households, which composed of elderly or late middle aged people and their grandchildren with absent parents are less able to move due to child-caring responsibilities and are most vulnerable. Multi-generational households with less dependent can use remittances for risk and vulnerability reduction. This study shows that household burdens and mobility decisions interact to influence vulnerabilities and adaptation options of fish cage farming households.

CS6-c Issues in Cities II

Jabodetabek Metropolitan Council: an alternative institutional arrangement

by *Triarko Nurlambang*

Flooding and heavy traffic congestion are main consequences of uncontrolled and mismanaged land use function. These issues have not yet been solved in the Jabodetabekjur area. Unsynchronized and disharmonized spatial planning, and its implementation due to policies and institutional arrangement conflicts are the clear root causes of these problems. The authors propose that having single Jabodetabekjur Metropolitan Council covering the whole Jabodetabekjur river basin might be a realistic alternative concept to the current arrangements. In principle, it might lessen conflicting policies conceptualisation and its implementation, rather than keeping to existing fragmented formal based local governments, which are not in line with the nature of Jabodetabekjur's spatial organization. In this sense, the Jabodetabekjur Metropolitan Council is based on the "Place Bounded Institution" approach. This alternative institutional arrangement for Jabodetabekjur development has been scrutinized by using mixed-methods of inquiry.

Land degradation potential and landing zone function in Subdistrict Sumbermanjing Wetan, Malang, Indonesia

by *Agung Hermawanto*

Subdistrict Sumbermanjing Wetan is mostly hilly, its land area largely used for agricultural activities. This research is an evaluation of land capability and population pressure on agricultural land using overlay method, scoring and interpretation. The data showed that District Sumbermanjing Wetan have land capability classes ranging from Class I-VII with mostly limiting slope (L), degree of erosion (e) and depth of the soil layer (k). The analysis of population pressure on



agricultural land in 15 villages found that there are 5 villages which are not experiencing population pressures: the villages of Tambakasri, Sidoasri, Kedungbanteng, Sumberagung, and Ringinkembar. As a result the potential degradation is high, the mountain fisiografinya conditions is dominant with the ability of class VI land and barrier L, e, and k. As to the land capability class, there were conditions, which cause the land to be unsuitable for agricultural use. District Sumbermanjing Wetan is most suitable for growing annual crops with the aid of a buffer zone.

Health issues of scavengers: preliminary study in Kayu Madang landfill site, Kota Kinabalu, Sabah, Malaysia

by *Abdul Hair Beddu Asis and Muhammad Tahir Mapa*

The use of landfills is one of the most popular methods for waste management in Malaysia. On the other hand, recycling programs are seen as a solution to uncontrolled dumping of waste and in alleviating the difficulties of finding a new area for landfills. The presence of scavengers in landfills has contributed significantly to the success of recycling programs (Seow & Radzuan, 2011). Among the driving factors for scavengers to get involved in the program is the difficulty in finding employment due to their education background or the lack of it. This study has two main objectives: to identify the health issues faced by scavengers and to know the available protective equipment used during scavenging. Observation and questionnaires were used to obtain data. Data collection was conducted on 15 May 2013. A total of 39 respondents were interviewed for this study. The study revealed that landfill scavengers face serious health problems due to their continuous exposure to the landfill environment. This includes direct exposure to landfill gases such as methane and carbon dioxide. Because of their status as illegal workers, there is no security measure meant to protect the scavengers. In relation to the recycling program, however, it is a fact that the scavengers contribute significantly and sustainably in reducing the amount of waste in landfills. Therefore, the government should recognize the needs of this community particularly in providing much needed health care and legal protection. This study could serve as a model for the national management of landfill. By this, it not only benefits the country but also the economic lives of the scavengers community.

Concurrent Session 7:

CS7-a Is Tourism the Way to Go?: Teachers' Roundtable

Teachers' field inquiry on tourism in Siem Reap

by *Chew-Hung Chang & Tricia Seow*

The recent curriculum review of high-school geography in Singapore has put greater emphasis on field inquiry. Consequently a special group of teachers joined this conference as part of a field trip package, both to engage in the field inquiry, as well as to take part in the wider and deeper discourse of geographies at the conference. The key inquiry framing the fieldwork session is: "Is tourism the way to go? Participants would have visited the key tourist attractions such as the Angkor temples, a floating village on the Tonle Sap Lake night markets, and other areas of interest in Siem Reap to understand the nature of tourism and tourist opportunities in this region of Cambodia. This roundtable session will provide a platform for the teachers who have participated in the field

inquiry to discuss their findings and reflect on the overall experience.

CS7-b Issues in Food Production II

The Singaporean aquaculture industry: swimming against the tide?

by *Guanie Lim*

This paper examines the aquaculture industry of Singapore focusing on the fish farming firms operating at the industry's upstream node. It analyses the operations of the fish farming firms and the difficulties of raising food fish, a relatively low value-added commodity, in an island where space is a premium. Based on research and qualitative personal interviews with the relevant stakeholders, the paper also unpacks the rationale of the Singaporean fish farming firms that have expanded their activities to other overseas destinations, especially the regions surrounding Singapore. The paper demonstrates that these firms predominantly invest into Malaysia's southernmost state of Johor. For these firms, Johor is viewed favourably because of its lower input cost vis-à-vis Singapore, proximity to Singapore, favourable physical geography, and the fish farming firms' relative familiarity with its investment climate. The paper concludes with some implications for policymaking and future research.

Identification of rural transition using changing agriculture area in Kuta Utara, Badung, Bali

by *Fithrothul Khikmah, Galih Dwi Jayanto, Isna Pujiastuti and Joko Christanto*

Rural transition in Indonesia is occurring very quickly especially in Java, Sumatra, and Bali. One such region is Kuta Utara Subdistrict, Badung Regency, Bali Province, Indonesia. Rural transition in Kuta Utara is caused by the influence of tourism and industrialization since Bali is one of the most visited tourism destinations in Indonesia. Agricultural area is reduced by development of tourism, population, settlement, and the effect of interaction between surrounding regions, which affects the society and environment in the Kuta Utara region. Badung is one of rice barns in Indonesia, and the transition of agriculture area in Kuta Utara will affect food security in the future.

The purpose of this study is to determine rural transition in Kuta Utara through examining the change of agriculture areas between 2001 and 2012. According to statistical data agriculture areas were reduced by about 319 hectare in the period 2001-2012. Using multi-year data, the intensity of changes and patterns of rural transition in Kuta Utara was examined through secondary data analysis, and spatial analysis using satellite imagery. This presentation will show the changes and patterns through thematic mapping of rural transition. The information on the agricultural area change can provide important information to the Indonesian government's decision-making process.

Distribution of agricultural damage due to Mount Kelud eruption in Pujon District, Malang, East Java

by *Desy Puspita, Fathiyya Ulfa and Fadiah Adlina Ulfah*

Mount Kelud erupted in February 2014 resulting to negative impact to the Pujon District, particularly affecting agricultural productivities and activities. Volcanic ash damaged agricultural areas with different intensity. This study was conducted to



determine and explain the distribution of agricultural damage in Pujon using the following variables: distance from the eruption centre, ash thickness, and the duration of ash exposure. Data were collected through field observations and interviewing farmers using questionnaires. Data analysis included mapping the thickness and length of exposure to volcanic ash with Inverse Distance Weighting (IDW) interpolation techniques (GIS), spatial correlation analysis and data layer overlays. The data showing the mild level of agricultural damage was in the southern part of Pujon, while moderate and severe levels of damage were in the northern part of Pujon. The analysis showing the distance variable did not affect the level of damage in agricultural areas. Damage was affected by the thickness of the ash and the duration of ash exposure. The thicker the volcanic ash and the longer the exposure to volcanic ash, the greater the agricultural damage.

CS7-c Inclusive Geographies: Whose Space Is It?

Minorities and diversity for sustainable social development

by *Walter Leimgruber*

Every country in the world is confronted with minorities, and resulting problems have to be solved in each specific context. The conventional approach to the minority issue is from a quantitative perspective (minorities as numerically inferior group), but beyond this there is the access to and the exercise of power, which determine the relationships between majority and minorities. Every society is a system, composed of numerous elements (usually minorities of some sort), a fact often forgotten by the mainstream social groups. Certain minorities are therefore either overlooked or persecuted, and the political system also tends to ignore them. Ethnic and cultural groups figure prominently among such minorities, but we can add other groups, such as the handicapped, the poor, the unemployed, or ex-convicts. However, minorities should be seen positively, as a sign of cultural diversity and a reminder of certain human duties. Diversity is desirable because it is the opposite to (sterile) uniformity and a challenge to linear thinking. The paper addresses the minority issue by drawing on the example of Switzerland, a country composed of several minority groups that are overlapping. The political challenge is substantial, and the changing national and international contexts put the system to a constant test.

Marginal societies and change: a study of the Orang Asli communities of Peninsular Malaysia

by *Sitiqhairunissa Ramli*

The *Orang Asli* Communities of Peninsular Malaysia number about 150,000 people and divided into many ethnic and sub ethnic groups. They are found mostly deep in the interior regions of the Peninsular, but some like the *meri* communities of *Carey Island* had settled offshore from the mainland. The Gombak Highlands part of the Main Range massif and located on the Upper Regions of the Klang River Basin are home to many *orang asli* ethnic and sub ethnic groups. The rapid development of the Klang River Basin has in recent years bridged the gap between development and the *orang asli* community's exposure to the impacts of development. The *orang asli* communities today, though brought into the overall development of the main stream Malaysian society, are still considered a society in transformation. This paper discusses the issues of development on the *orang asli* communities in the Highland Regions of Peninsular Malaysia. The discussions are centred on the use of a Vulnerability Assessment Model that incorporates three major components of Threat, System at Risk and Adaptation towards Sustainable Habitation. The study postulates that development and the associated land

transformation process has brought about change to the local environmental processes behavior and these would impact on an orang asli community system which possess low resilience in terms of household structures and locality, population incomes, socio-demographic characteristics and livelihood activities that are much dictated by the behavior of the environment. The future challenge of the orang asli communities toward sustainable habitation thus lies in trying to answer what makes them vulnerable, what are the inherent adaptive capacities and coping mechanisms and what needs to be addressed in the immediate, short term and long term future. The study used a number of approaches and techniques of data collection that included surveys, observations and instrumentations to address the three major components mentioned.

Typologizing the Kachin contemporary mobilities

by *Karin Dean*

Mobilities as both mappable movements and as about meanings, are central for understanding spatialities determining the forms and intensities of social interactions. The paper will focus on the Kachin state in Northern Myanmar and is a first attempt to typologize the various forms and waves of the Kachin spatial mobilities within the shifting contexts of the Kachin state during the past decades of protracted conflict and the interim ceasefire. By tracing the movements and life trajectories of Kachin youths, based on surveys and in-depth interviews, the paper first presents mobilities as a trans-local process linking multiple localities within the same social space across (territorial) places. It then looks at Kachin mobilities as a capability that people have developed as “collective production: whose development entails time, making, competition, and conflicts” (Sassen 2006). The conditions and practices of the various types of mobilities are identified as among the crucial factors in Myanmar’s economic, social and political developments, its rural transition and ongoing urbanization.

The Trans-political Nature of Southwest China’s Energy Conduit, Yunnan Province

by Thomas Ptak

Energy and associated social, political, economic and environmental implications resulting from production distribution and consumption shape-and are shaped by a broad range of factors. Many of these dimensions are both transnational and geopolitical in nature. However, energy infrastructure is commonly situated in peripheral regions. Sites of resource extraction are often in frontier zones, far removed from urban and industrial areas that consume power produced in remote locations. Distribution networks, such as oil pipelines and transmission wires, are often buried underground or routed through uninhabited spaces. Thus, infrastructure supporting energy production and distribution are often shielded from the public gaze and as a result are often uncritically accepted along with consumptive practices, as everyday landscapes of modernity.

As a consequence, the ways in which energy moves across borders and shapes regional development has received inadequate attention in geographic research. This is surprising when one considers the variety of phenomena that are directly linked to energy use. China’s Yunnan province functions as one of the country’s ‘energy conduits’, as energy enters and exits across international and provincial boundaries. Thus, in China’s bridgehead to Southeast Asia, energy and dimensions emanating from its production, distribution and consumption play a key role in leveraging Chinese influence in the region. Drawing on field work undertaken in Yunnan over the past twelve months, this paper investigates the ways that energy development, specifically large dam construction and the Sino-

Myanmar oil and gas pipelines, shape Yunnan's functional form as an energy conduit, while examining regional implications that are both transnational and geopolitical in nature.

CS7-d Issues in Southeast Asia

Quantification of Drilling-Induced Contamination in Arsenic Prone Well Waters in Kandal Province, Cambodia

by Laura Richards, Daniel Magnone, Bart van Dongen, Christopher Ballentine and David Polya

Arsenic contamination in Southeastern Asian groundwaters is a major public health hazard affecting millions of people. A key factor controversially implicated in the release of arsenic into groundwaters from surrounding sediments is surface-derived water from ponds and other sources. An uncertainty in some of the studies probing this topic is if the manual techniques used to drill boreholes introduces to the well waters external sources of surface-derived contamination, which are falsely attributed to natural drawdown of surface waters or other natural surface groundwater interactions. Although drilling is widely used in groundwater monitoring and other applications, it does have the inherent problem of introducing some degree of external contamination into the natural systems being monitored; this is particularly problematic when studying incompletely consolidated shallow sediments which are widely used as aquifers across many parts of Asia.

In this study we directly address this by using a lithium-based tracer to quantify the extent of drilling related contamination in borehole waters and sediment cores across 16 sites in Kandal Province, Cambodia. We report here the utility of lithium tracers to quantitatively evaluate and correct for the degree of drilling related contamination. The major implications of this work are firstly a demonstration that lithium tracers can be used to quantify and correct for drilling-related contamination. The method was verified by comparison to changes in naturally occurring sodium, ammonium and nitrate as a function of flushing volume. Secondly, drilling-related contamination averages 1 – 2 % after two to three borehole volumes of flushing but could still persist after greater than seven borehole volumes of flushing. The quantification of this allows for direct correction of various biogeochemical parameters for the influence of drilling-related contamination. These results provide valuable and detailed information on the extent of drilling-related contamination associated with manual drilling techniques which are prevalent in Southeast Asia.

Acknowledgements: This research was funded by a NERC Standard Research Grant (NEJ023833) and an NERC PhD studentship (NE/L501591/1, Magnone). We are deeply indebted to the essential help of Chansopheaktra Sovann (RUPP), Chivuth Kong (RUA), the hard work and expertise of our local drilling team led by Hok Meas and the permissions support and interest of local landowners and tenants. We thank Lori Frees and Lori Allen of RDI-Cambodia for coordination assistance and support.

Education and Religious Institution as Agents of Change, a Community Social Capital of Disaster Prone, a case study in Magepanda Village, Sikka District, Nusa Tenggara Timur Province, Indonesia

by Widyawati Sumadio

Magepanda is a village located on the north coast of Flores Island, which is prone to natural disasters. Every year earthquakes, floods, droughts, and hurricanes strike the area



In 1992, a tsunami that struck the area took the lives of a sufficient number of people. The indigenous ethnic group of this village is the Lio people. They live side by side with migrants from Sulawesi, which are dominantly of Bajo and Bugis ethnicity. As migrants, Bajo and Bugis have different cultures than the native people. In an effort to reduce the impact of disasters, the entire population of the village needed to develop cooperation and participation in common activities. One of the assets that can reduce the impact of disasters is social capital. This study aims to identify the community social capital in the aftermath disaster resilience program. In order to do so, this study conducted a household survey and interviews. The results showed that traditional cultural values have been replaced by new values that are based on technology and information brought in by migrants. The new value is not only possessed by the local people but also by migrants. It is argued that new cultural value create better social capital within the community. Trust and co-existence among ethnic groups in the community become strong social capital in building a resilience program. Along with the migrant influence, education and the church are also important agents in changing the cultural value. The young and educated generation might have an opportunity to change the way of thinking and belief of the community in facing disaster. On the other hand, to carry out trustworthy and effective programs, religious organization which have already built trust in the community, could have stronger authority. By developing a stronger planning program, the government might be a representative officialdom that is reliable and can act fairly and remain unbiased to all communities.

Vulnerability Assessment of the Impact of Urban Heat Islands: A Comparative Study Of Bandar Lampung And Jakarta Metropolitan Area

by Tumiar Katarina Manik and Syarifah Syaukat

Global climate change impacts in community daily life occurs through different types of disasters. In tropical areas, natural disasters related to hydrometeorology are more common while in coastal areas sea level rise needs serious attention. At the local scale (city level), urbanization problems and local rising temperature affect the communities' life quality. UHI (Urban heat islands) refer to the magnitude of the difference in observed ambient air temperature between cities and their surrounding rural regions. This research aims to identify the urban heat island phenomena in Jakarta, a metropolitan city with business and industrial background and Bandar Lampung a growing city with agricultural background; to identify community vulnerability to UHI impacts and community adaptation efforts related to UHI. The results showed that UHI was identified both in Jakarta and Bandar Lampung. UHI occurred clearly in morning temperature in Bandar Lampung showing that the surrounding area had more air moisture due to vegetation land cover compared to the city area which was dry. In Jakarta, UHI occurred clearly in the afternoon and the highest temperature was at high density settlement area compared to business-industrial area. Both Bandar Lampung and Jakarta had average (moderate) vulnerability level. Bandar Lampung's moderate vulnerability level is also a result of low community knowledge of climate change impacts and low availability of public facilities; but Bandar Lampung did well in adaptation even though this was a natural spontaneous adaptation, while in Jakarta the moderate level of vulnerability is because of the high temperature rise and low adaptation level due to low communities' participation in community programs, in general.

Index of authors and speakers

- A
- Abdul Razzaq Bakri, 15, 49
Amanda Miller, 10, 26
Autsadawut Mongkolkaew,
16, 51
- B
- Bing Sheng Wu, 4, 14, 20,
40
Brian Shaw, 10, 24
- C
- Carl Grundy-Warr, 10, 12,
28
Celine Pierdet, 9, 24
Chea Eliyan, 20
Chester Antonino Arcilla,
10, 25
Chew-Hung Chang, 4, 6, 9,
15, 19, 20, 62
Choon Piew Pow, 10, 26
- D
- Dennis Choi, 16, 51
Dhrubajyoti Ghosh, 18, 20,
21, 58
Diah Rossy Pratiwi, 12, 16,
34, 52
Diana Peters, 11, 33
Diganta Das, 4, 18, 19, 58
- E
- Edo Andriesse, 16, 50, 51
Enrico Garcia, 10, 16, 29,
52
- F
- Fithrothul Khikmah, 17, 19,
56, 63
Frances Ess, 16, 54
- G
- Gaim Lungkapis, 11
Galih Dwi Jayanto, 17, 19,
56, 63
Guanie Lim, 19
- H
- Hanifah Mahat, 14, 43
Harriot Dr. Beazley, 10, 26
Harvey Neo, 11, 30
Hiroko Nagai, 16, 54
Hung Pham, 11, 14, 32, 42
- I
- Isna Pujiastuti, 17, 19, 56,
63
Ivy Tan, 4, 13, 16, 18, 53
- J
- James Sidaway, 12
James Terry, 10, 27
Jean-Christophe Diepart,
11, 15, 31, 47
Jinwen Chen, 13, 36
Jonathan Rigg, 9, 20, 21
- K
- Kalyani Chatterjea, 4, 11,
16, 32
Karin Dean, 12
Kay McArdle, 11, 30
Kim Chuan Goh, 14, 43
Kim Irvine, 4, 12, 15, 18,
57
Kntayya Mariappan, 11, 33
- L
- Laura Richards*, 66
Le An Ngo, 13, 39
Liana Williams, 15, 45
Liberty Pascua, 15, 48
Long Trinh Thi, 18, 57
- M
- Maine Suadik, 11, 33
Mak Sithirith, 12, 13, 38
Mark Griffiths, 13, 37
Mohammad R. Rahnama,
10, 27
Mohammad Tahir Mapa,
11, 33
Moreen De Silva, 11, 33
- N
- Noranida Mokthsim, 12,
33
- P
- Paul Porodong, 11, 33
Phaothai Sin-Ampol, 18,
60
Philip Hirsch, 12
Phuong-Thao Nguyen, 15,
48
Po-Yi Hung, 11, 30
- Q
- Qiu Fen Jade Chen, 16, 53

R

Rahil Ismail, 10, 24
Robin Biddulph, 11
Rodolphe De Koninck, 15,
44

S

Sallie Yea, 13, 14, 19, 35,
44
Santita Ganjanapan, 18, 59
Seak Sophat, 13, 40
Sekson Yongvanit, 17, 20,
55
Sitiqhairunissa Ramli, 19,
65
Sotheavin Doch, 15, 47
Sothorn Kem, 11, 31
Syarifah Syaukat, 67

T

Tammy Kwan, 13, 21

Tess Guiney, 13, 37
Thomas Ptak, 12
Timothy James Cipriano,
16, 52
Tricia Seow, 4, 16, 18, 19,
53, 62

V

Vernon Tan, 10, 29

W

Weerakan Kengkaj, 18, 59
Widyawati Sumadio, 66
Winston Chow, 9, 23

Y

Yong Jiang, 13, 38
Yves Boquet, 10, 26
Yvonne X.Y. Ng, 9, 23, 24