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NCCR North-South
newsletter
Research Partnerships for Sustainable Development

Contents

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Focus on Southeast Asia

Shifting cultivation is a traditional agricultural practice in tropical forested landscapes. It is often blamed for deforestation and soil degradation. However, if practiced at low intensity including long fallow periods, shifting cultivation may be very sustainable and promote biodiversity. Photo: Cornelia Hett

Maps and systematic knowledge for better interventions

The array of NCCR North-South activities in Southeast Asia may appear broad, but they all share a common goal: generating knowledge that enables policymakers to advance sustainable development, alleviate poverty, and better people's lives.

And so, researchers in Vietnam are mapping the transformation of agriculture and the welfare of small-scale farmers, indicating where their access to markets could be improved. Or, in Laos, researchers have generated a first-ever spatial overview of hydropower and mining projects; others have devised a way to visually monitor shifting cultivation and deforestation, giving policymakers a tool to steer land use towards sustainability.

Elsewhere, in Thailand, environmental engineers are modelling the interaction of land use and water pollution, looking for strategies to protect public health and ensure water quality – including innovative approaches that trap harmful wastes while diverting nutrients for use as fertiliser. Back in Vietnam, overall public health is the main concern of specialists working to expand people's access to effective, sustainable toilets. Finally, other researchers are studying the health of a specific population group: internal migrant labourers caught up in Vietnam's rapid economic growth.

Editorial

Thammarat Koottatep

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NCCR North-South Regional Coordinator Southeast Asia

To properly manage the rapid global change occurring in Southeast Asia, people in the region require new knowledge and increased research capacity in the area of sustainable development. NCCR North-South programme activities in Southeast Asia aim to support development of interventions that address environmental and livelihood challenges, enhance agricultural practices and human welfare, increase access to sanitation, and improve management of health risks.

Our research in Southeast Asia is organised according to three main themes: sustainable sanitation and health interventions for vulnerable populations; landscape transformation and natural resource use; and access to livelihood means among marginalised populations. Geographically, much of the research focuses on the so-called Greater Mekong Subregion, an area in which some 90 million people rely heavily on one massive waterway – the Mekong River – for their livelihoods. The question of how best to use and protect the water flowing through it is a central concern of many of our projects.

The fieldwork of NCCR North-South researchers in Southeast Asia is overseen by the Regional Coordination Office located at the Asian Institute of Technology in Pathumthani, Thailand.

Many of our research findings are being translated into broader policy and local practices through a key NCCR North-South mechanism for testing results, called PAMS, or Partnership Actions for Mitigating Syndromes: 12 of these pilot projects have been successfully implemented in the region. We also make sure that our evidence is disseminated to relevant practitioners, policymakers, and professionals by means of policy briefs, NCCR North-South *Dialogues*, *Outcome Highlights*, and scientific publications – over 100 to date – including books, chapters in anthologies, and journal articles.

This newsletter presents selected research findings, tools, and approaches that have been generated in Southeast Asia, emphasising both scientific advancement and the potential benefits for local policy and capacity development.

Focus on Southeast Asia

Analysing spatial patterns of agricultural transition

One emphasis of NCCR North-South research in Vietnam is that of analysing structural changes in agriculture. This is done using high-resolution statistics and detailed geographic information from Vietnam's two most recent agricultural censuses (2001 and 2006). Thus far, the analyses have revealed several key dynamics occurring in Vietnam's agricultural sector. For one, distinctive regional hotspots of agricultural intensification are visible – where farmers have stepped up production of high-value crops on existing agricultural land – as are areas of extensification, in which farmers have increased the number of agricultural production zones. Also observable are distinctive areas of significant transition from rice cultivation to cultivation of high-value crops – cashews, coffee, peppers – and raising of livestock, in addition to changes in livestock holding patterns across Vietnam. Finally, patterns of de-agrarisation may also be seen, reflecting a shift away from agriculture in favour of off-farm activities such as wage labour or provision of particular services.

The NCCR North-South researchers take these geographically enhanced agricultural statistics – which may be visually represented as

different layers on a map – and compare them to changes in market access, for example, as well as household welfare statistics, across the same region and over the same period of time. Among other benefits, analytically linking such key spatio-temporal information enables insights into the relative success of recent pro-poor development policies implemented across rural Vietnam. There are many possible uses of such information and insights, including:

1) to better target pro-poor interventions throughout the country, for example, by supporting income diversification, improving poor people's access to and participation in markets, and supporting agribusiness development among rural households;
2) to improve national and sub-national development planning, particularly regarding food security, by highlighting the trade-offs between production of staple foods and production of commercial crops;
3) to enhance environmental and sanitation planning, for instance regarding pesticide use in agriculture or the disposal of animal waste when raising livestock;
4) and to advance the analysis and prevention of diseases in humans and animals, for example, by examining and displaying the spatial coexistence and concentration of particular animal species, human settlements, and drivers of transmission and infection.

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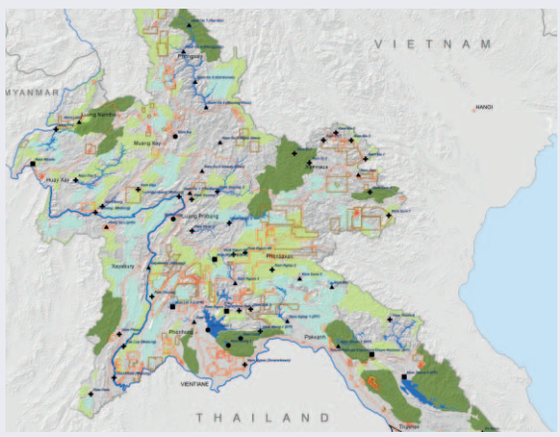
Mapping mining and hydropower to inform policy

The mountainous geography of Laos bears significant potential for generation of hydropower. The country is also rich in mineral deposits, particularly copper and gold. Due to economic reforms occurring in the socialist country and the government's focus on exploration of hydropower and mining as possible sources of royalty and tax revenues, these sectors are expanding at galloping speed. Until recently, there was no comprehensive spatial overview of the extent and the dimensions of hydropower and mining in Laos. However, understanding the spatial distribution of these sectors is essential for policymakers to maximise the benefits of development for poverty reduction, economic growth, and the environment. It is also essential for minimisation of risks.



Researchers have created maps showing the extent of mining and hydropower projects in Laos. Source: Andreas Heinimann

A recent study by the World Bank and CDE addressed this issue by compiling available hydropower and mining data, and visually representing it on maps. The study identified over 100 hydropower projects at various stages of planning in Laos, in addition to nine existing plants and nine under construction. With the aid of CDE's "Socio-Economic Atlas of the Lao PDR", the study also revealed a source of risk: based on available information of prospective reservoir areas, 63 of the planned hydropower projects would flood at least 290 villages, affecting around 100,000 people (about 2.5% of Laos's rural population).

Interestingly, hydropower projects in the earliest planning stages were more likely to be found in very marginal areas. The estimated poverty rate (2008) in areas of incipient hydropower projects was significantly higher (49%) than the poverty rate in areas of more advanced projects (41%), while both were above the national poverty rate (34%). The study also uncovered some conflicts in spatial planning, such as planned hydropower and mining projects that would encroach on protected areas.

The study results found a wide echo in policy and development arenas, contributed to dialogues, and were published in the high-profile Lao PDR Development Report 2010 of the World Bank, CDE, EU, and Australian Government.
http://siteresources.worldbank.org/LAOPRDEXTN/Resources/293683-1301084874098/LDR2010_Mapping.pdf
http://siteresources.worldbank.org/LAOPRDEXTN/Resources/293683-1301084874098/LDR2010_Full_Report.pdf

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Detecting deforestation

Does shifting cultivation, also referred to as slash-and-burn agriculture, invariably lead to expanding deforestation? – "No, not always" says Cornelia Hett, a PhD student from the NCCR North-South and the Centre for Development and Environment (CDE), University of Bern. Together with colleagues from CDE, the Institut de Recherche pour le Développement (IRD) and the Centre for International Forestry Research (CIFOR), she has developed a new approach for mapping and characterising areas of shifting cultivation.

Shifting cultivation has recently come under intense scrutiny as a possible major contributor to deforestation and carbon dioxide emissions. Some policymakers would like to see it banned altogether. Still, the extent to which shifting cultivation causes tropical deforestation is far from clear. And its practitioners are typically indigenous subsistence farmers with few or no other livelihood options, making the stakes for banning it very high. Further, if practiced at low intensity, incorporating long fallow cycles, it may be a very sustainable agricultural method that encourages biodiversity and enables local populations to feed themselves a rich and varied diet. This is the consensus of most in the scientific community.

Until recently, it was difficult to verify or refute claims about shifting cultivation's deforestation effects, because landscapes under shifting cultivation typically don't show up on conventional land cover maps. But now the team of researchers has devised an approach that literally puts shifting cultivation on the map. It works by innovatively interpreting pixel-based land cover maps produced from Landsat Satellite imagery. By analysing clusters of pixels and converting them into colourful "mosaics" based on distinguishable spatial patterns, the researchers can identify and delineate swathes of land under shifting cultivation. In addition, the approach enables them to differentiate areas of natural forest, degraded forest, and fallow forest undergoing regrowth.

The results of the study show that shifting cultivation should not be automatically equated with uncontrolled deforestation. The landscapes mosaics approach developed by the team of researchers could serve as a useful tool to promote its sustainable application,

A typical shifting cultivation landscape in northern Laos. On the steep mountain slopes plots currently cultivated interchange with former plots laced with shrubby fallow vegetation. This leaves behind a very patchy looking landscape which is highly dynamic over time. Photo: Cornelia Hett

giving policymakers of the UN's REDD+ scheme the reliable data they need to steer shifting cultivation towards longer crop–fallow cycles that allow carbon-absorbing forests to regrow and soils to replenish.

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Water pollution and land use

The heavily polluted Tha Chin River Basin in Thailand has been the focus of many recent NCCR North-South studies. The research investigates the relationship between river water quality and nearby land use, such as paddy field farming, livestock raising, and residential living. Runoff water from these human activities is often full of nutrient pollution – high levels of nitrogen and phosphorus – which can cause algae to rapidly grow, reducing oxygen levels in the river basin and threatening aquatic animals. In order to obtain a spatial and temporal overview of water quality, the researchers are analysing the river basin by means of a Mathematical Material Flow Analysis model. The MMFA model can trace the flow and transformation of pollution from the point where it is produced to where it is separated, treated, and/or discharged into water bodies.

In complement to this, researchers are studying hydrological patterns in the river basin. By merging hydrological data with their data on pollution discharge, they can quantify the balance of pollutants versus water in the river.

Runoff water from human activities causes algae to grow in the Tha Chin River, Thailand, reducing oxygen levels and threatening aquatic animals. Photo: Thammarat Koottatep

It all combines to create a comprehensive picture of the chain of events involved in pollution of waterways. This will enable policy-makers and stakeholders to identify specific places to intervene – such as paddy fields that overuse chemical fertilisers – and support development of broader pollution-control strategies and effective regulations.

One of the main sources of pollution in Southeast Asia's waterways is poorly treated wastewater released from sewage plants. The current system of centralised wastewater management as practised in many Southeast Asian cities is not successful due to the high costs of construction and maintenance, say NCCR North-South researchers. Instead, they propose treating wastewater in a decentralised way by introducing simple but effective and affordable technologies that can be maintained at community level. Advantages of decentralised wastewater treatment include that it allows both solid and liquid fractions of domestic wastewater to be treated close to their origin. It is also inexpensive, simple to operate, and may generate revenues for its operators from the reuse or recycling of its products.

Suitable technologies for decentralised wastewater treatment include anaerobic baffled reactors and constructed wetlands. Both technologies are described in the NCCR North-South policy brief "Sustainable sanitation in urban centres in Southeast Asia", available for download at *http://www.north-south.unibe.ch/content.php/page/id/305*.

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Improving sanitation services: who will pay?

In 2008, only 50% of Vietnamese households in rural areas had access to improved sanitation such as safe, effective toilets. While the government has committed itself to increasing the proportion of people with access to improved sanitation, it cannot afford to subsidise sanitation for the entire population. Thus, improving rural sanitation in Vietnam continues to rely heavily on the financial contributions of household-level private users, which in turn depends on their willingness to pay for such services.

Knowing people's willingness to pay is crucial for sanitation planners when assessing the economic viability of projects, setting fees, evaluating policy alternatives, gauging financial sustainability, and designing socially equitable subsidies. But such information on household-level demand is currently scarce to non-existent in Vietnam. To address this knowledge gap, NCCR North-South researchers began surveying people in communities about their willingness to pay for specific sanitation improvements – such as innovative, sustainable flush toilets – in an effort to pinpoint the socio-economic factors that determine that willingness.

In a rural community in northern Vietnam, researchers randomly selected and surveyed 600 households, conducting personal interviews with the main breadwinners or decision-makers in each. They used a survey technique called the contingent valuation method (CVM) to obtain relevant economic data. It consists in asking individuals how much they are willing to pay for a change to the quantity or quality (or both) of a particular commodity. The method has been widely used in recent decades by environmental economists looking to estimate the benefits of environmental improvements and other public goods.

Preliminary analyses of the collected data revealed that nearly 90% of households were willing to pay for improved sanitation services. People were prepared to spend 2–5% of their disposable income on better sanitation. As might be expected, wealthier households expressed more willingness to pay for improvements. Final analysis of the survey results will be completed by spring 2012.

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Health of internal migrants

Countries that have undergone rapid economic growth have also experienced marked increases in internal migration. Though migration often enables people from rural areas to find better-paid jobs in cities and other areas of economic activity, migrants often face a greater health risk. NCCR North-South researchers in Vietnam have launched an effort to assess migration flows, the health problems experienced by inter-provincial migrants, and their access to social and health care services.

Analysing Vietnamese migration patterns, the researchers noted several trends: a steep rise in the absolute number of migrants over the past 20 years; a significant increase in their share of the total population; a shift away from male-dominated migration in favour of female-dominated migration; and an increasing proportion of younger migrants. The development of industrial zones, the expansion of cities, and large national construction projects have been crucial "pull factors" encouraging migrants to abandon one province and head to another.

The increased migration flows require improved infrastructure and adapted health systems that ensure access to appropriate health care for at-risk migrants, especially young women. The job opportunities for Vietnamese women have grown significantly in urban areas – in textile, footwear, and garment factories – and women account for more than 50% of inter-provincial and rural-to-urban migrants. Yet they are often forced to live in poor conditions and face health risks such as reproductive tract infections (RTIs).

The researchers found that about one in four female migrants had RTI symptoms. Yet less than a quarter of them had ever visited a health centre, and even fewer went for regular health check-ups – this, despite the fact that around 80% had health insurance. The women who did not use health services typically were less educated, were away from home for the first time, earned less, knew little about RTIs, and had various misconceptions about reproductive health. Their employers displayed limited interest in RTIs or other health issues affecting female workers.

A researcher interviews a young woman who works in a textile factory in the Sai Dong industrial zone, in Hanoi. Migrant labourers like her often work very long shifts, share residences no bigger than 10 m² with multiple roommates, and have difficulty accessing health care services. Photo: Lien Thi Lan Pham

The researchers plan to expand their health surveys to three major Vietnamese cities. This time they will also be seeking information on mental illnesses that various stakeholders believe may be widespread among internal migrants. The researchers' overall objective is to identify the most appropriate ways of supporting the health of Vietnamese migrants.

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In a nutshell: NCCR North-South Southeast Asia

Since 2002, the NCCR North-South programme has made a significant contribution to the regional research capacity and interdisciplinary knowledge for development in Southeast Asia. The knowledge generated is helping practitioners cope with the challenges surrounding sustainable health and sanitation, stakeholder processes for development interventions, and the livelihood-environment nexus. Innovative research is being carried out and tested with field investigations in Cambodia, Lao PDR, Thailand, Vietnam, and the Yunnan Province in China. The NCCR programme has also successfully provided a unique platform for research partnerships with practitioners from regional academic institutions, government departments, local communities, and international organisations. Building on the research competency achieved through the NCCR North-South, it is envisaged that a regional research centre of excellence will be set up to sustain and concretise innovative research outcomes into practices leading to sustainable development in the region.

Alumni Interview

Our guest in this edition of the Alumni Interview is Surinkul Narong, a Thai national who currently works as a senior research engineer at the Asian Institute of Technology in Bangkok. He completed his PhD within the NCCR North-South in December 2009.

What did you do your PhD on? *My thesis was on "Integrated Pathogen Flow Analysis (PFA) and Quantitative Microbial Risk Assessment (QMRA) for Health and Environmental Sanitation Planning". I worked on identifying health risks related to complex processes of urbanisation, in particular water- and food-borne diseases stemming from poor sanitation. In Southeast Asia, contaminants can often be found in water used for drinking, irrigation, industry, recreation, etc. My PhD research proposed a sanitation-planning tool for urban or peri-urban areas that integrates assessment of environmental impacts and human health impacts.*

What has your career path been after leaving the NCCR North-South? *After graduating, I joined the Asian Institute of Technology as a senior researcher. My current work is quite similar to my previous research at NCCR North-South. But now I'm involved in a greater number of projects and in applying the results of previous studies. My responsibilities have expanded to include project management and coordination. The network and experience I obtained access to at NCCR North-South have helped me handle these new tasks.*

How has your research made a difference – can you give a concrete example? *Generally, sanitation planning tools and health risk tools are kept separate. And both require supporting data from laboratory analyses. When data is limited or non-existent regarding a specific point or area that such tools are meant to address, the planning or risk assessment process can become stalled. As part of an effort to integrate sanitation planning and health risk assessment, I developed predictive models that trace the source of pathogens, their possible pathways, and potential points of human exposure. The models may even be applied when the available data is limited, reducing the time and expense of developing interventions. The minimum data needed are ranges of water or waste flows and concentrations of specific pathogens, for example E. coli, at the original source. These data can be obtained from testing. While the scope of my work did not capture all the relevant environmental processes – my model mostly focused on canal networks for urban farming systems – the methodology I proposed can be further extended.*

What are you currently working on? *I am presently working in different capacities on three projects in Thailand: as a water and wastewater expert for the "Climate and Sustainable Tourism Project" under the Designed Areas for Sustainable Tourism Administration (DASTA); as a water expert for the "Green Hotel Project" under the Agence Française de Développement (AFD) and Kasikorn Bank (KBANK); and as a key researcher for the "Assessment of Faecal Sludge Properties Project" under the Bill & Melinda Gates Foundation. The first two projects aim at supporting hotels in applying "green" knowledge in their infrastructure and business model – incentivised by "soft loans" – including adoption of a corresponding management system, water and energy efficiency, solid waste management, wastewater treatment, and reuse of treated water. This enables hotels to obtain green certification, promoting sustainable development in the business world. The faecal sludge project I'm involved in is quite technical – it aims to provide data for improvement of desludging equipment and the overall process.*

What, for you, are the greatest challenges in your current work? *From a macro perspective, the greatest challenge of my work is to develop an innovative sanitation system that will have a big impact and meaningfully improve existing conditions. From a micro perspective, looking at Thailand in particular, I want to help local people and local authorities increase their capacity to achieve and maintain good standards of sanitation.*

What would you change, if you could? *It would have to involve my area of expertise: water and sanitation. I would like to see us achieve the Millennium Development Goals in this area. If I could make it happen, I would expand access to clean water for those who lack it, and increase people's sense of responsibility for properly treating their waste. This would contribute to global sustainability.*

Where do you see yourself in ten years' time? *It is difficult for me to say where I'll be and exactly what I'll be doing. But with my experience and expertise in engineering and research, I would like to be in a position where I can pass on my knowledge – of innovative sanitation and best practices – to the next generation.*

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NCCR north south

NCCR North-South News

NCCR North-South regional policy briefs

The NCCR North-South's series of regional policy briefs continues to grow. Two have been produced to date in collaboration with the Southeast Asia Regional Coordination Office: "Sustainable sanitation in urban centres in Southeast Asia" and "Safe use of wastewater in agriculture and aquaculture". These and others are available for download at: *http://www.north-south.unibe.ch/content.php/page/id/305*

Outcome Highlights

Visit *http://www.north-south.unibe.ch/content.php/page/id/315* to download the NCCR North-South's *Outcome Highlights* series. Three *Outcome Highlights* focus on Southeast Asia: "Microbial risk assessment in Vietnam", "Atlases of human welfare", and "Steps to a safer, cleaner community".

NCCR North-South Dialogue No. 37: Glossary of Terms in Water Supply and Sanitation

This publication by Nguyen Viet Hung et al. aims at developing a comprehensive English–Vietnamese glossary of terms in the field of water and sanitation. Its purpose is to create a platform to facilitate exchange among people working in this field in Vietnam and to reach a consensus about various definitions and translations. It may be downloaded at: *http://www.north-south.unibe.ch/content.php/publication/id/2645*

3rd ICRD: Research for Global Transformation

The 3rd International Conference on Research for Development (ICRD) takes place 20 – 22 August 2012 at the University of Bern, Switzerland. The conference will offer participants an opportunity to discuss their experiences with research partnerships. Its objectives are to:

- share and discuss recent insights on development-oriented research conducted in North-South partnerships
- outline an agenda for research partnerships with developing and transition countries in support of more equitable and sustainable global transformation.

The conference will have a strong focus on the global South; but the role of the global North will also be addressed. For more information: *www.icrd.ch*

Partnership Regions

Programme Management

- The NCCR North-South is directed by a board made up of representatives from the Swiss Partner Institutions together with the Regional Coordinators.
  It is headed by programme directors Hans Hurni and Urs Wiesmann, and coordinated by Thomas Breu.

Swiss Partner Institutions

- Centre for Development and Environment (CDE)
  University of Bern
  Hans Hurni and Urs Wiesmann
  www.cde.unibe.ch
- Development Study Group (DSGZ)
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  Marcel Tanner and Jakob Zinsstag
  www.swisstph.ch
- Department of Water and Sanitation in Developing Countries (Sandec) at Eawag (Swiss Federal Institute of Aquatic Science and Technology), Dübendorf
  Janet Hering and Chris Zurbrügg
  www.sandec.ch
- Graduate Institute of International and Development Studies (IHEID), Geneva
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