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Editorial

On bridging gaps

Southeast Asia has been a focus for research by the global alternatives to Slash-and-Burn (ASB) program (http://www.asb.cgiar.org) since 1994. ASB has been recognized for 'scaling up' results of its research to the global level and its findings on tradeoffs between global environmental concerns and local and national development objectives, both of which have been useful in the global debate on sustainability (CGIAR, 2000). However, other more localized environmental services at the landscape and watershed scales were recognized as a significant gap in this analysis in terms of impacts on local people, priorities of key policymakers and in the potential complementarity of landscape and watershed (what we call 'meso-scale') environmental issues with global environmental concerns such as habitat loss and carbon sequestration.

This 'missing middle' at the meso-scale (identified in Tomich et al., 1998a; elaborated in Tomich et al., this volume) was the organizing theme of a workshop held in 1999 in Chiang Mai, Thailand, to bring researchers and policymakers together to address two broad classes of questions. Do policymakers have the information they need about flows of environmental services within Southeast Asia's upland 'landscape mosaics' to understand whether new, targeted environmental policies are needed . . . and to avoid repeating costly mistakes? And are researchers on track to provide useful scientific inputs for developing and testing promising new environmental policy interventions at the meso-scale when and where they are needed within the region?

The 16 papers in this volume grew out of questions posed by policymakers and 26 scientific papers and 44 posters presented at that 1999 workshop (Tomich et al., 1999) and were developed through an ongoing, multidisciplinary discussion initiated at that time. Tomich et al. introduce the collection by raising some guiding questions about three specific environmental problems at the meso-scale: smoke pollution, degradation of biodiversity functions, and degradation of watershed functions—and making a preliminary assessment of where each of these problems lies in an environmental 'issue cycle'. Van Noordwijk et al. develop general unifying principles that guide the inquiry toward answers to these questions and, in the process, show how trees and small patches of forest can play a major role in flows of water and connectivity allowing movement of organisms. Subsequent authors then address the three specific meso-scale problems. For each, a synthesis paper considers the implications for research at the present stage in the 'issue cycle' (Byron; Swift et al., Bruijnzeel), focusing on Southeast Asia, but with much wider relevance as well.

Our recognition of the practical importance of meso-scale issues can in no small part be traced to the regional smoke crisis in Southeast Asia in 1997/1998 (Tomich et al., 1998b). Although there has been anecdotal awareness of fire management by village institutions, Hoare's case study in northern Thailand was one of the first to document the strengths and weaknesses of this approach. It also provides insights from practical experience in attempting to bridge the gap between villagers and local authorities regarding regulation of fire. In contrast to the promising local results, the complementary study by Murdiyarso et al. of broader efforts to link science and policy processes reveals continuing deficiencies in mechanisms to address the smoke problem at national and regional levels. Byron's synthesis suggests priorities for research 'while it is raining outside' to prepare for the next oscillation—of El Nino and of the 'issue

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cycle'—in the hope of moving beyond the recurrent regional blame game.

Landscape-level services arising from maintaining or increasing biodiversity are the most challenging (scientifically) and perhaps the most difficult to discern (practically) among our three themes (National Research Council, 2001). But widespread and advanced stages of conversion of natural forests to human dominated landscape mosaics throughout Southeast Asia (and indeed pantropically) makes it difficult to avoid some difficult questions. How can species–area relations and ecosystem functions across various forest-derived land uses be assessed in a timely and useful manner for policymakers? Which (if any) meso-scale environmental services are threatened by reduction of biological diversity? And, in response, which is the better strategy to maintain threatened services, segregation or integration of production and conservation (Van Noordwijk et al., 1997), and under what specific conditions? The papers on biological diversity in this collection include four practical approaches to partial evaluation of these functions at the landscape scale. Two take a 'silvo-centric' (ecological) perspective, using an indicator taxon approach (Beukema and Van Noordwijk) and plant functional types (Gillison and Liswanti). Two others approach the practical valuation problem from more anthropocentric perspectives on conflicts (Nyhus and Tilson) and opportunities (Cannon and Surjadi) arising from habitat conservation. All four of these papers primarily concern themselves with aboveground plants, larger terrestrial mammals, or marine ecosystems with potential for ecotourism. In their synthesis paper, Swift, Izac and Van Noordwijk shift and broaden the scope to consider the totality of species across the full range of terrestrial organisms in a pioneering attempt to identify basic relationships underlying the functional roles of biodiversity underpinning productivity within landscape mosaics. They consider whether this topic is ready to move on from an initial pioneering stage to a research programme with much greater focus on specific ecosystem functions crucial to agricultural productivity, sustainability, and resilience and the necessary concomitant focus on the groups of organisms that provide these services.

Watershed services have a much longer, but uneven, history regarding practical and scientific emphasis on specific functions. As with biodiversity functions, a part of the challenge in studying watershed functions is the long time lags separating land cover change and resulting effects on some (but not all) watershed functions. This also is one source of the gap between policy concerns and scientific results. It is expensive to setup and maintain a high-quality monitoring network to address the long-term questions (especially regarding base flow and groundwater recharge). Mungai et al. report on two of the few surviving such long-term efforts in the tropics. There also can be some quick impacts, however, usually associated with extreme rainfall events. Erosion/sedimentation is one of the most salient among watershed functions and is examined from contrasting—yet similarly pragmatic—perspectives using biophysical experiments (Ziegler et al.) and economic simulations (Shively and Coxhead). Two more comprehensive views—again contrasting approaches from environmental economics (Pattanayak) and physical hydrology (Bruijnzeel)—both give particular emphasis to baseflow. In his sweeping synthesis, Bruijnzeel considers whether approaches to watershed functions are fossilized in dysfunctional 'business as usual'—or poised for a renaissance.

This multidisciplinary collaboration also has aimed to bridge gaps *within* science. We are grateful for the dedication and patience of the authors whose work is published in this volume; to 87 referees who helped us pursue dual goals of rigor within disciplines and accessibility across disciplines; and to over 100 participants in two ASB workshops on these topics held in Chiang Mai in 1999 and in 2001, who contributed their ideas and insights. We also wish to express thanks to Joyce Kasyoki, Catherine Kimengu, Subekti 'Yayuk' Rahayu, and Cornelia Halim for processing text and figures; to Pramualpis 'Pong' Kanthatham and her team in Chiang Mai who graciously managed arrangements for the two workshops that were key elements of this international collaborative effort as well as the Royal Forest Department and Chiang Mai University, who hosted the workshops; and to the agencies that provided major funding for those meetings. The Asian Development Bank (RETA 5711) provided the major share of funding for this publication and for the regional workshop on 'Environmental Services and Land Use Change: Bridging the Gap between Policy and Research in Southeast Asia' from 31 May to 2 June 1999, which initiated the collaboration that

produced this volume. A follow up global workshop on 'Bringing the Landscape into Focus: Developing a Conceptual Framework and Identifying Methods for ASB Work at the Landscape Level', was held in Chiang Mai 12–13 November 2001 and organized in collaboration with the ASB thematic working group on sustainable land use mosaics, led by Stephan Weise of the International Institute for Tropical Agriculture (IITA), with major funding provided by the Consultative Group on International Agricultural Research (CGIAR).

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