

Lessons from long-term monitoring of soil erosion in three southeast Asian agricultural catchments undergoing rapid land-use changes

**C. VALENTIN¹, A. BOONSANER², J. L. JANEAU³, P. JOUQUET¹,
T. HENRY DES TUREAUX⁴, S. HUON⁵, K. LATSACHACK⁴, Y. LE TROQUER⁶, J.
L. MAEGHT⁴, D. ORANGE³, PHAM DINH RINH³, A. PIERRET⁴,
P. PODWOJEWSKI¹, O. RIBOLZI⁷, A. DE ROUW⁵, O. SENGTAHEUANGHOUNG⁸,
N. SILVERA⁴, H. ROBAIN⁶, B. SOULILEUTH⁴, W. THOTHONG², TRAN DUC
TOAN³ & TRAN SY HAI³**

1 Bioemco–Biogéochimie et Ecologie des Milieux Continentaux, Institut de Recherche pour le Développement, IRD, Université Pierre et Marie Curie, 32 av. H. Varagnat, 93143 Bondy cedex, France
christian.valentin@ird.fr

2 National Park, Wildlife and Plant Conservation Department, Ladyao, Jatujak, Bangkok 10900, Thailand

3 Soils and Fertilizers Research Institute (SFRI), Vietnam Academy for Agricultural Science, Hanoi, Vietnam

4 Bioemco–Biogéochimie et Ecologie des Milieux Continentaux, Institut de Recherche pour le Développement, IRD office c/o Department of Agricultural Land Management (DALaM), PO Box 4199, Ban Nongviengkham, Xaythany District, Vientiane, Lao PDR

5 Bioemco–Biogéochimie et Ecologie des Milieux Continentaux, Université Pierre et Marie Curie, Case courrier 120 Tour 56/66, 4ème étage 4, place Jussieu, 75252 Paris Cedex 05, France

6 Bioemco–Biogéochimie et Ecologie des Milieux Continentaux, Institut de Recherche pour le Développement, IRD, c/o Land Development Department, LDD, Office of Science for Land Development Phaholyotin Rd., Chatuchak Bangkok 10900, Thailand

7 GET Géosciences, Environnement, Toulouse, Institut de Recherche pour le Développement, IRD, Université Paul Sabatier, 14, avenue Edouard Belin 31400 Toulouse, France

8 Department of Agricultural Land Management (DALaM), PO Box 4199, Ban Nongviengkham, Xaythany District, Vientiane, Lao PDR

Abstract While soil erosion is reasonably well documented at the plot scale, data remain scarce at the catchment scale and predominantly stem from short-term studies. In this context, the “Management of Soil Erosion Consortium” network, which recently became the Multi-Scale Environmental Changes observatory (MSEC3, <http://www.msec3.net/portal/>), was established in the late 1990s in three upland catchments of Laos, Thailand and Vietnam. New land management options, introduced in consultation with farmers, were tested in terms of runoff and erosion. These included tree plantations, planted fodder, and no-till cover systems. The MSEC demonstrated that converting land from shifting cultivation systems to short rotations, or permanent cropping of species such as maize, cassava or teak, can result in increased erosion far beyond any tolerable rate of soil loss. Fodder and no-till cover systems are efficient means of controlling soil losses, yet several socio-economical obstacles can limit their adoption.

Key words catchment; runoff; soil erosion; upland rice; maize; cassava; teak; fodder; shifting cultivation; steep slopes