Bamboo species – 'filter' species to mitigate the potential pollution and improve income for smallholder farmers? (Bamboo to eat shoots, and leave the soil)

World Agroforestry Centre
TRANSFORMING LIVES AND LANDSCAPES

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1. Background and Hypothesis

Bamboo species (*Gramineae bambuseae bambusoideae*) provide important income and household consumption to low-income rural residents. According to a local knowledge study in Hoa Binh province, Vietnam, bamboo maintains fertility and productivity of the land because of surface litter accumulation, minimized leaching and long-term primary productivity. A study in Kenya shows that bamboo absorbs water faster than most other plants and is used to clean sewage water in some parts of the world. Bamboo may also be one strategic option of waste prevention and recycling. The uncontrolled dumping of large amounts of urban organic solid wastes in Vietnam causes pollution and ground water contamination. One of strategies since 1980s in dealing with this problem in northern Vietnam is composting solid waste to produce organic fertilisers (OF). However, farmers are skeptical to these OF and risk of the high concentrations of heavy metals is reported in literature.

Our assumption is that Bamboo may function as an efficient 'filter', which takes up plant nutrients as well as trace (heavy) metals from the OF, and thereby mitigates the risk of environmental pollution. Significant nutrient inputs to the soil, obtained by applying OF together with a better land management, are expected to promote farm production of significant quantities of high quality bamboo products. This is an innovation for upland-lowland interaction for sustainable livelihood and environment protection.

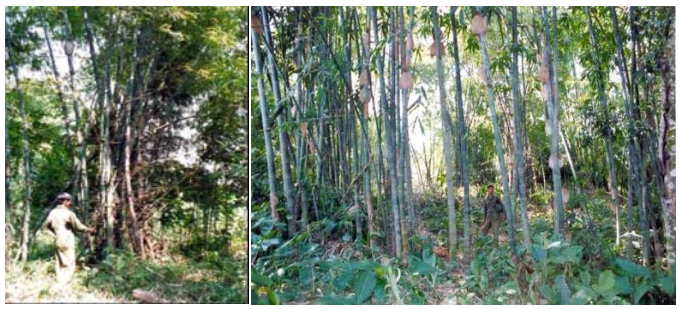

Figure 1. Photos from Hoa Binh province, Vietnam. Tre gai (Bambusa blumeana, to the left), Tre Mai (S. Gigantea, to the right), La Nguyen, 2003.

2. A Minor Field Study (MFS)

A 4-month MFS, financed by Sida, was carried out in northern Vietnam in 2006 with a view to (i) Identify the most demanded bamboo species through a market survey for further study; (ii) Study the nutrient and heavy metal contents in compost and in the selected bamboo, through field survey and literature review. The overall objective was to plan for a new research project on prospects of bamboo species be used as 'filter' species to mitigate the potential pollution and improve income for small-holder farmers.

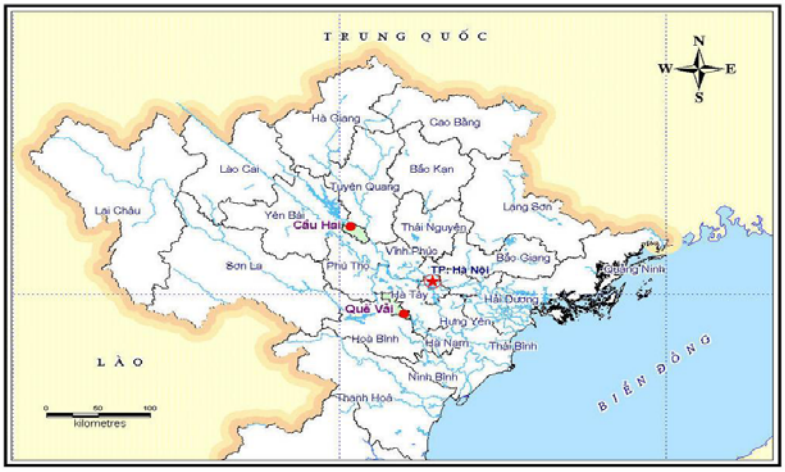

Figure 2. The study sites (Cau Hai and Que Vai) in Northern Vietnam.

Figure 3. Photos from Cau Hai site, Phu Tho, Vietnam. Luong (*Dendrocalamus membranaceus*), Frandsen, 2006.

3. Findings and Recommendations

- The demanded bamboo species were Tre Gai (*Bambusa blumeana* J.A.& J.H. Schultes) , Tre Mai (*Sinocalamus gigantea* Munro) and Luong (*Dendrocalamus membranaceus*). The bamboo species were in high demand, either for edible shoots, or for construction/handicraft market.
- The organic matter (OM) content of the compost was found 20 times higher (variating between 11-40%), compared to OM contents in the soils (Hyperdystric Acrisol and Xanthic Ferralsol, 2,79 % and 1,38 %, respectively) in the midland, where bamboo spp are common. The high OM, combined with rather large particles (>15 mm) of coarse compost and low available nitrogen content, makes compost a possible soil improver and a complement to other fertilisers.
- Local farmers did not seem to be aware of compost as the organic fertiliser. A recommendation for a further study could be to investigate farmers' perception concerning the use organic in combination with mineral fertiliser.
- Heavy metal analyses done for Luong biomass, and literature study show that content of Cu, Zn, Cr, Pb were much higher in root than in stem and leaves. Thus, bamboo spp for edible shoots should not be used as 'filter' species.
- Luong (*Dendrocalamus membranaceus*) is recommended for further study as 'filter' species because it is easy to grow, and has high economic potential for construction, furniture material, and paper pulp.

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