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SYNOPSIS

The Potential of Bamboo is Constrained by Outmoded Policy Frames

Kathleen Buckingham, Paul Jepson, Liangru Wu, I. V. Ramanuja Rao, Sannai Jiang, Walter Liese, Yiping Lou, Maoyi Fu

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INTRODUCTION

There is a disjunction between modern international forestry policy and the needs of many people in developing countries. Recent international forest policy has focused on the implications of tropical deforestation for climate change, biodiversity loss and livelihoods. In particular the efficacy of the REDD (Reduced Emissions from Deforestation and Degradation) mechanism has dominated international discourse. However, a key emerging issue for many developing nations is continued supply of timber and pulp resources in the face of increasing demand. Bamboo presents a promising alternative to products produced by silvicultural forestry (Hunter 2002). Currently, international policy focuses on forests as treed lands thereby marginalising bamboo forestry development. This year is the International Year of Forests. In this synopsis we argue that policy makers should take this opportunity to encourage a policy process that will accord bamboo equal status to silviculture in future international forest regimes.

Bamboo species are highly versatile and rapidly renewable, long been used as a timber alternative for flooring, construction, furniture, charcoal, crafts and food. New technologies are extending bamboo's value as a source of composite fibres: for paper, viscose and rayon fabrics, and in the construction of wind turbines. The rapid growth rates of bamboo (75–1,000 mm per day in peak growing periods) mean that it can be harvested more frequently than comparable short-rotation silviculture species (e.g. Eucalyptus) (Kumar and Sastry 1999).

Countries in Asia, Africa and Latin America are assessing their bamboo resources. Whilst authoritative statistics are lacking, estimates suggest a global bamboo resource of 31.3 million hectares distributed across 21 countries (FAO 2010). China has the fastest growing bamboo sector: having increased by 54% since 1970 and now standing at 5.38 million hectares (2.8% of total forest lands) (SFA 2009) worth an estimated US$ 11.8 billion (Dou and Yu 2008). However, of the 1,200 bamboo species, only 58 species produce timber, 18 are used for pulp and paper and 56 for edible shoots (Li and Kobayashi 2004).

THE MARGINALIZATION OF BAMBOO IN INTERNATIONAL FOREST POLICY

The potential of developing countries to develop their bamboo resources is constrained by the combination of bamboo's ambiguous institutional position and the dominance of silvicultural forestry. The problem has at least four dimensions: (1) Some forms of cultivation are governed by agricultural departments others by forest production, but bamboo is not 'core' business to either; (2) Historic policy frames equate forests with trees which seek to accommodate bamboo in silvicultural management logics and statistics despite it being a fundamentally different plant; (3) the power and influence of western silvicultural science and practice in international development; (4) the growing influence of market-based forest policy instruments, notably Forest Stewardship Council (FSC) certification and the REDD mechanism, which are designed for trees and not for bamboo. As a result bamboo receives minimal attention by development agencies, research and development is

Fig. 1 Bamboo forest in Anji, Zhejiang province, China (Photographer: Kathleen Buckingham)

underfinanced which is causing unproductive controversy and tension as timber and pulp markets seek to apply silvicultural certification mechanisms to a 'grass'.

Bamboo's marginalization from international forestry policy frames is easy to trace. International forestry policy is informed by silvicultural systems that developed in the absence of bamboos. Commercial bamboos are absent from North American and European floras and colonial forestry was mostly concerned with timber for construction. In addition, the combination of bamboo's classification as a 'grass', perceptions as 'poor man's timber' and an invasive species mean that it receives limited research and policy attention in western forestry circles. In short, bamboo is neither quite a tree nor a crop and has been of only marginal interest for powerful line ministries relating to agriculture and forestry. Bamboo is an institutional 'orphan': a 'timber' resource governed by policy and science developed for species with fundamentally different ecologies.

In an attempt to redress these problems, the International Network for Bamboo and Rattan (INBAR) was created in 1997. As a result the inclusion of bamboo in international forestry mechanisms and definitions is expanding; however, bamboo is still classified as a *non-timber* forest product and by implication less valuable than timber. INBAR's pragmatic approach has been to lobby for bamboo to be recognised as equivalent to a *tree* within existing mechanisms, so as to expedite bamboo's inclusion in the definitions of various policy instruments associated with the Clean Development Mechanism (CDM). The resulting policy notes that 'Palm (trees) and bamboos can be considered equivalent to trees in the context of A/R (afforestation/reforestation)' (UNFCCC 2008). However, there are compelling arguments to adopt a more assertive approach and advocate a fundamental reassessment of international forest policy that creates a separate category for bamboos on the same level as trees. First, bamboo could deliver many key contemporary forest policy needs as well or better than trees. Second, the ecology of bamboo requires fundamentally different models of commercial management. Third, existing forestry mechanisms, such as FSC, are inappropriate when applied to bamboo. Bamboo and silvicultural forest policy diverge regarding different cultivation ecologies, issues of 'illegal logging' operate on less challenging and more local scales, bamboo harvesting requires fewer safety measures, and biodiversity policy linkages relate more to its invasiveness rather than species richness assemblages.

TOWARDS SUSTAINABLE (BAMBOO) FOREST MANAGEMENT

Bamboos and trees have fundamentally different rooting systems. Bamboos have rhizomes which regenerate and spread underground. If a rhizome is cut it does not die, as would a root, but become several plants instead of one. Bamboos are classified according to three different rooting structures—monopodial (diffuse) sympodial (clumping), and amphodial (mixed)—which have distinct policy and management needs (Jiang 2007). Chinese bamboo forestry

is dominated by one monopodial species, *Phyllostachys heterocycla* var. *Pubescens* known as Moso (Fig. 1). This forms the extensive even stand 'forests' familiar from Chinese films. Moso accounts for approximately 72% of the total bamboo area in China and over 90% of the bamboo economy (Dou and Yu 2008). Currently the big policy challenges relate to the regeneration of intensive monocultures, promoting mixed forestry, combating soil erosion and assuring adequate fertiliser applications. In contrast, India has predominantly sympodial bamboo species. The key policy challenges are dealing with mass die off after flowering and assuring supply of planting material linked to developing improved propagation.

International forest policy is of strategic importance in areas such as climate change, biodiversity and sustainable development. The limited research on bamboo carbon sequestration indicates that it may have equivalent or greater capacity to trees (Lou et al. 2010). In bamboos, 52% of carbon is stored in the culm (used for durable products); the 3–5 harvesting cycles under commercial bamboo creates the possibility to rapidly build carbon pools (Liese 2009). However, under the CDM, most accounting mechanisms only recognise 'in situ' carbon credits residing in standing trees: carbon accruing within harvested wood products is not generally accounted for. Because bamboos have a shorter life cycle than trees they must be harvested and converted into products in order to sequester carbon. The failure of the CDM to adequately recognise harvested wood (bamboo) products raises concerns that the carbon sequestration potential of bamboo is being over-looked and by implication figures on carbon emissions are overestimated (Marland et al. 2010).

BAMBOO FOREST CERTIFICATION

The international governance discourse of 'sustainable forest management' which emerged after the Rio Summit in 1992 produced produced new tools and partnerships involving NGOs and business (Arts and Buizer 2009). These harnessed the power of green consumerism by introducing eco-labels, notably the FSC standard. Many building and construction standards now require FSC certified materials leading to pressure from the construction industry operating in alternative timber markets for bamboo to be incorporated within FSC (Mosobo 2010). Similar pressure is now coming from the pulp and paper industry. While FSC standards *can* be applied to bamboo, its application in China appears premature and unhelpful. Private bamboo enterprises have thus far been unsuccessful in achieving FSC certification without state finance. When applied to bamboo, FSC creates an expensive, unnecessary paper trail without promoting significant positive changes in bamboo management. This creates market barriers for the majority of bamboo growers who lack access to external finance. Furthermore, FSC conceptions of bamboo certification are based on intensively managed large scale Chinese bamboo monoculture plantations. All of the 47 634 ha of FSC certified bamboo forests are in China. However, this model of cultivation does not exist in other countries. In India and elsewhere, bamboo grows as a small-scale horticultural crop on homesteads. A related problem concerns FSC definitions of natural forests and plantations. Certification bodies operating in China have difficultly assigning bamboo to either category. Since bamboo naturally regenerates, confusion is created over which standards to apply. FSC is in effect forcing external notions of environmental auditing on a cultivation system without prior discussion on purpose and efficacy. This risks promoting confusion and hostility that could undermine trust and credibility in FSC. Although smallholders globally have faced challenges reaching FSC standards regardless of the species, bamboo can be considered a unique case since it competes directly in timber markets.

In 2005 in Brazil FSC passed a motion to improve and expand its guidelines on bamboo and rattan forest certification (FSC 2005). Subsequently FSC's approach has not fundamentally changed. Their definitions continue to deploy a 'tree' as the benchmark for forestry understanding. For example FSC notes: "There are many species of bamboo, the larger of which may be considered treelike. Larger areas of such bamboo are often referred to as 'bamboo forests'". Bamboos can be certified as a Non Timber Forest Product (NTFP) within the matrix of a forest, or as 'treelike' within plantations or natural forests (FSC 2010). Fundamentally, many experts question the need for a label to assure the sustainability of bamboo production arguing that the physiology of the plant makes this a given. However, improvements in commercial intensive bamboo plantations are needed for the sustainable development of the resource. In short, bamboo needs a certification framework designed to meet the distinctive characteristics of bamboo forestry. Some efforts are underway, for example under the Chinese State Forestry Administration with the intension to seek the Programme for Endorsement of Forest Certification (PEFC) accreditation and an initiative of bamboo organisations in Latin America to revitalise a previous failed attempt at bamboo certification. Issues of national autonomy, generally applicability, cost and stakeholder acceptability represent major challenges for the development of a bamboo standard. It is pertinent to note that forest certification was designed for tropical forests, yet has had far greater up take in northern temperate regions constituting 90% of all certified forests (PEFC 2009). This has helped institutionalise certification. The same cannot happen for bamboo as it is

absent from these regions thereby underlining the need for frameworks suited to tropical and sub-tropical regions.

CONCLUSION

To realise the potential of bamboos, old western framings as a poor man's timber and invasive weed need reassessing. Physiological characteristics previously considered undesirable can now be re-evaluated in terms of resilience regarding climate change and the need to reduce pressure on timber resources. For example, China's 2008 snow disaster caused extensive damage to forests. Destroyed bamboo forests have already recovered and are contributing to livelihoods: the same is not the case for the region's fir forests. Bamboo management is not without its challenges. Adequate research and development needs to consider the negative impacts from its invasive qualities, impacts on biodiversity and of flowering. However, given increasing global shortages of land available for agriculture, expanding populations, the rise in consumerism with resultant increased demand for resources along with new threats from climate change, natural resource management needs to be reassessed with scientific and technology investments to extend production and open new markets. To realise the international potential of bamboo we require a more structured scientific and policy exchange involving China and India and other southern countries. We should seize the opportunity of the 2011 UN Year of Forests to bring bamboo fully into the forest frame and to initiate a process of policy reform leading to the development of bamboo-specific policy approaches and tools. The challenges of creating a frame for sustainable bamboo management are significant, but given the potential of commercial bamboo forestry to promote sustainable development, provide alternatives to timber products, sequester carbon and restore degraded land, such an initiative could generate far reaching benefits for humanity and the environment.

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Kathleen Buckingham (✉)
Address: School of Geography and the Environment, Oxford University Centre for the Environment University of Oxford, South Parks Road, Oxford OX1 3QY, UK.
e-mail: kathleen.buckingham@ouce.ox.ac.uk

Paul Jepson
Address: School of Geography and the Environment, Oxford University Centre for the Environment University of Oxford, South Parks Road, Oxford OX1 3QY, UK.

Liangru Wu
Address: China National Bamboo Research Centre, 310 Wenyi Road, West Lake District, 310012 Hangzhou, Zhejiang, People's Republic of China.

I. V. Ramanuja Rao
Address: The International Network for Bamboo and Rattan (INBAR), 8 Fu Tong Dong Da Jie, Wangjing, Chaoyang District, Beijing 100102, People's Republic of China.

Sannai Jiang
Address: The State Forestry Administration of the People's Republic of China, 18 Hepingli dongjie, Dongcheng District, Beijing 100714, People's Republic of China.

Walter Liese
Address: Department of Wood Science, The University of Hamburg, Leuschnerstr.91, 21030 Hamburg, Germany.

Yiping Lou
Address: The International Network for Bamboo and Rattan (INBAR), 8 Fu Tong Dong Da Jie, Wangjing, Chaoyang District, Beijing 100102, People's Republic of China.

Maoyi Fu
Address: The Chinese Academy of Forestry, Sub-Tropical Forest Research Institute, 311400 Fuyang, Zhejiang, People's Republic of China.