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Participatory technology development for incorporating non-timber forest products into forest restoration in Yunnan, Southwest China

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ABSTRACT

Indigenous knowledge has become a topic of considerable interest within the research and development environment. Incorporating indigenous knowledge into state-led 'top-down' conservation and development programmes, however, is still a great challenge. This paper presents a case from Yunnan, Southwest China, in which indigenous knowledge has been integrated into the development of an agroforestry model with non-timber forest products for the Sloping Land Conservation Programme (SLCP) by using a participatory technology development (PTD) approach. This approach was adopted to increase the likelihood that technologies developed would be suitable for resource-poor households. It is expected that integrating indigenous and scientific knowledge, will lead to positive ecological and economic outcomes. Finally, the paper argues that the integration of indigenous knowledge in both forestry policy formulation and implementation is important in the context of sustainable forest management in mountain areas.

1. Introduction

Indigenous knowledge is being used increasingly in traditional healing (Cox, 1999), biodiversity conservation (Xu et al., 2005a), forest management (Ramakrishnan, 2007), maintaining resilience of social–ecological systems (Berkes et al., 2000), and sustainable land use (Thapa et al., 1995) and livelihoods (Flavier et al., 1995). Its significance is widely recognized at the international level, for example in the Convention on Biological Diversity (Posey and Dutfield, 1996). A current challenge is the development of strategies to incorporate indigenous knowledge into state-driven conservation and development programmes. In developing countries, where rural communities are shifting from subsistence livelihoods to market-oriented economies, the role of indigenous knowledge in poverty alleviation is much debated (Ellen et al., 2000). While there are advocates for increased use, recognition, and preservation of traditional knowledge at national level, there are many questions about how to develop and adapt indigenous knowledge in the context of rapid technical, political, and economic change.

Rich in cultural and biological diversity, Yunnan Province, known as the 'the roof of Southeast Asia', is home to 45 million people from 25 distinct ethnic minorities, most of them living between 1000 and 3000 masl. The Chinese government has a strong interest in political security in this mountain region and is also concerned about environmental impact on the economies of Yunnan and the surrounding provinces, all of which are affected by the headwaters of the Yangtze, Salween, Irrawaddy, Mekong, Black, Red, and Pearl rivers. A nationwide project, the Sloping Land Conversion Programme (SLCP) or 'Grain for Green' programme, was recently introduced to encourage on-farm afforestation on a large scale. By providing grain and cash subsidies to encourage farmers to plant trees on their croplands, the programme's main objective is to convert vast areas of steeply sloped agricultural land to forest or grassland, specifically targeting areas with slopes greater than 25°. Although this initiative was originally in response to the hydrological instability of the Yangtze and Yellow rivers, the project has spread beyond their immediate watersheds. The potential impact of the SLCP on indigenous people is great as it affects over 750,000 ha of cropland and more than 10 million mountain inhabitants (Xu and Wilkes, 2005). The programme has several other goals, ranging from erosion control and improvement of hydrological stability to poverty alleviation (Bennet, 2008). The government, however, has not incorporated indigenous forest-related knowledge into species' selection, tree planting, and forest management in this programme (Xu and Ribot, 2004). Forest restoration and conservation policies are implemented from the top-down and often fail to recognize the diversity of indigenous

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species valued for their non-timber forest products, indigenous knowledge and practices, or the capacity of local farmers to adapt their land management and livelihood tactics to changing circumstances. One particular challenge is that of developing a 'sustainability' strategy to maintain the positive benefits of SLCP following the end of subsidies.

This paper discusses a pilot project, carried out in Baoshan Prefecture in Yunnan Province, to find species of non-timber forest products that can be cultivated with trees on agricultural land, which are not only economically viable for farmers, but also ecologically acceptable from a government perspective in the context of the SLCP. The project used a participatory technology development (PTD) approach, based on the findings of social, ecological, and policy studies which have indicated that reciprocal, functional links between biodiversity, indigenous knowledge, and livelihoods provide long-term resilience and incentives for conservation (Berkes, 2006). The present paper examines the potential for incorporating indigenous knowledge into biodiversity conservation and development of livelihoods, as well as building local capacities for watershed restoration.

2. Methods

2.1. Study site

Longyang District, in Baoshan Prefecture of Yunnan Province, is situated between the upper reaches of the Salween and Mekong rivers. It is one of the areas targeted for both the National Forest Protection Programme (NFPP) and the SLCP in a national effort to conserve watersheds. The pilot study was carried out from 2002 to 2007 in a small watershed that feeds into the Nu River (Salween), located in Yangliu Township, Baoshan Prefecture, Yunnan Province (25°13′01″N: 99°01′38″E) (Fig. 1). The watershed is situated on mostly steeply sloping land covering an area of 42.35 km^2. It has one administrative village, Pingzhang, which includes five natural villages with a total population of 7300. The inhabitants of these villages are from the Yi and Bai ethnic groups whose per capita annual income in 2002 was 106 USD, according to Yangliu Township Government's records.

The watershed has a subtropical climate influenced by the Indian monsoon. Mean annual temperatures range from 11 to 14 °C with rainfall from 1600 to 1800 mm, 80% of which is concentrated in the months of May through October. Elevations range from 1100 to 3000 masl, and the watershed's complex topography and elevation provide opportunities for a variety of agricultural management practices. Farmers grow paddy in the lower areas (below 1600 masl) near the river and corn and potatoes at higher elevations (>1600 masl). The natural forest vegetation is dominated by pines (*Pinus yunnanensis* and *Pinus armandii*) and alder (*Alnus nepalensis* D. Don); these forests provide a favourable important non-timber forest products. The local community collects mushrooms, pine nuts, and a wide range of medicinal plants from the forest and, in addition, cultivates walnut trees (*Juglans regia*) to earn additional cash income.

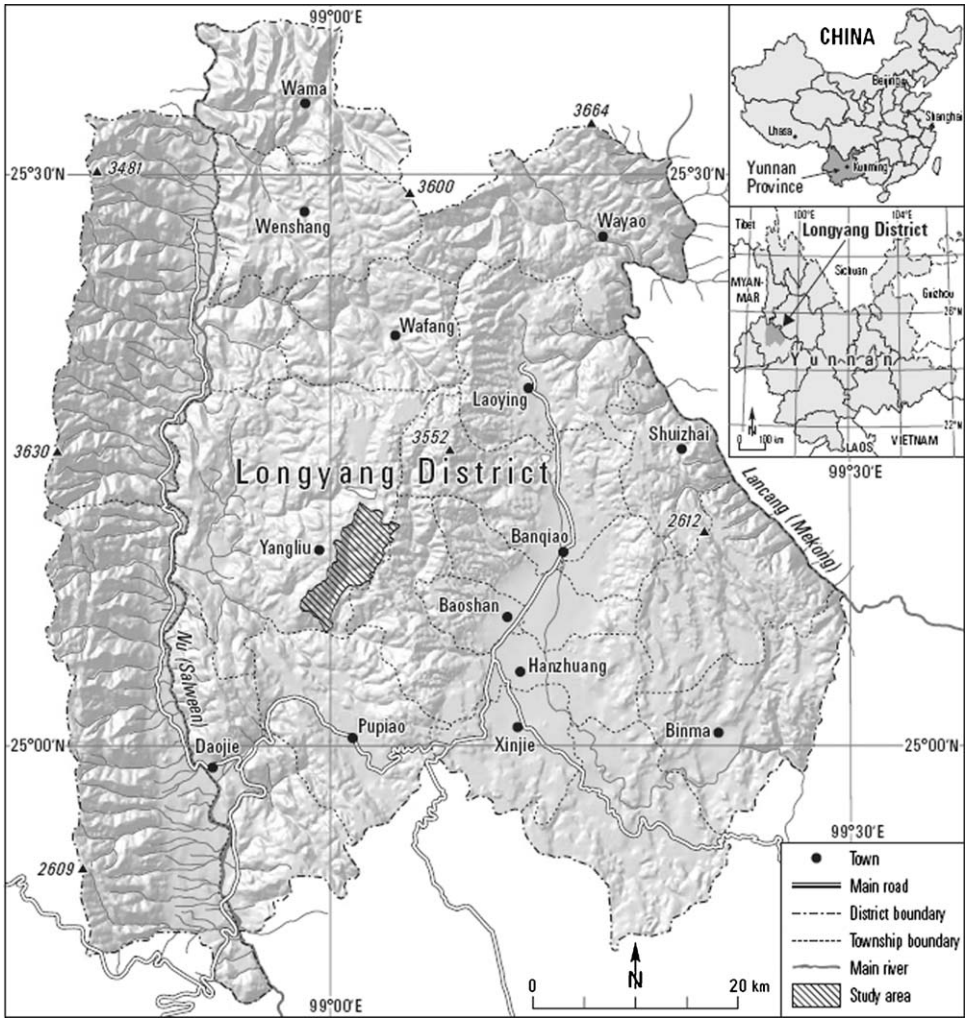

Fig. 1. Location map showing Yangliu Watershed in Longyang district of Yunnan Province, China.