The potential of timber-agroforestry to meet Sarawak’s forestry demand

A Ngu and N H A Bahar

1 Lot 4225 Block 16 BDC Commercial Center, 93350 Kuching, Sarawak, Malaysia
2 Tropical Rainforest Conservation & Research Centre, Lot 2900 & 2901 Jalan 7/71B Pinggiran Taman Tun Dr Ismail, 60000 Kuala Lumpur, Malaysia
3 Young Scientist Network, Academy of Sciences Malaysia, Level 20, West Wing MATRADE Tower, 50480 Kuala Lumpur, Malaysia

* Corresponding author: abrahamngu15@gmail.com

Abstract. Many forest communities in Sarawak, and globally, practise some form of smallholder management system including agroforestry. Yet, agroforestry practitioners predominantly focus on non-timber crops as the major source of income while the timber output remains understudied and underutilized. Smallholder timber agroforestry systems, therefore, have huge potential to equitably meet the increasing demand for both timber and food while reducing the pressure on natural forests. We investigate the readiness of agroforestry smallholders in Sarawak to supply timber commercially, and the opportunities and challenges they face. Semi-structured interviews were conducted with Sarawak forestry stakeholders including agroforestry farmers, timber industry actors, civil society organizations, academia, and government agencies. Descriptive statistics are used to analyse the data. Our results demonstrate that smallholders in Sarawak lack technical silvicultural and horticultural knowledge and formal timber market access, despite majority smallholders expressing interest in timber production. The underutilization of smallholder timber is linked with conservation and protection objectives. Legal constraints, limited capacity building and lack of market information were cited as major barriers for smallholders. Key recommendations to lower barriers for smallholder participation include provision of resources and an enabling legal framework that harmonizes agriculture and forestry demands while being inclusive of smallholders’ perspectives and realities.

Keywords: Social forestry; agroforestry; smallholder; timber; readiness.

1. Introduction

Agroforestry systems have shown to fulfil multiple objectives such as diversified income generation, food security, and delivery of other ecosystem services such as climate change mitigation, biodiversity enhancement and soil improvement [1-3]. In addition to direct income generation from selling crop and timber harvests, self-utilization of timber from the agroforestry system reduces the cost of building houses, boats and other structures. Despite the significant financial contribution of timber, it remains underutilized since non-timber crops (fruits, rubber, vegetables etc.) are the main source of incomes in many agroforestry systems [1-4].

Agroforestry systems that successfully optimize both timber and crops are considered as the most promising options to achieve forest conservation, rural development and poverty reduction, as well as community empowerment [5-7]. Inclusion of local communities and smallholders in sustainable timber production via timber-agroforestry can promote conservation of natural tree stands in fragmented forest-agricultural mosaics as well as restoration of degraded areas. Active community participation in forest restoration and management is crucial towards a more inclusive, transparent and sustainable forest management in Sarawak and globally [8-11].
The multidimensional benefits of agroforestry are widely established, however there are key challenges in successful adoption and implementation of this system. The challenges, as identified from past agroforestry pilot projects in Sarawak, include long gestation period and profitability, insecure land tenure, labour requirement, and research and extension difficulty due to its multidisciplinary approaches, among others [1]. Whether this set of challenges is applicable to timber-agroforestry remains unknown.

Our study explores the current opportunities and challenges faced by Sarawakian communities and smallholders in producing timber via agroforestry system. The outcomes of this study may inform policymakers, government, community leaders and civil societies to pave the way for small scale timber-agroforestry production especially in communal context.

2. Material and methods

Semi-structured interviews were conducted with Sarawak forestry stakeholders including agroforestry farmers (smallholders and communities), timber industry actors, civil society organizations, academia, and government forestry agencies (n=24). The interviews were conducted between mid-September 2021 to early November 2021 in virtual platforms (via Zoom and WhatsApp calls) to overcome travel restrictions due to COVID-19 pandemic.

Respondents were asked about smallholders and/or communities’ interest and capacity to produce commercial timber, as well as their familiarity on the licensing process of timber production. For these questions, respondents were asked to choose from 6-point Likert scale (1-strongly disagree, 2-disagree, 3-slightly disagree, 4-slightly agree, 5-agree and 6-strongly agree). The Likert-scale responses were expressed in percentages. Respondents were then invited to explain their answers and provide more description on the challenges and opportunities experienced by smallholders and communities.

3. Results and discussion

3.1 Demography of stakeholders

A total of 24 stakeholders from different ethnicities provided their responses. The majority of the respondents represented smallholders’ farmer/community and civil society organizations (CSOs) (Figure 1a). Forty percent of respondents were youth (aged 35 and below) and 30% were female. The range of experience in agroforestry and forest industry varied from 5 to 50 years.

![Figure 1. (a) pie chart shows percentage of stakeholders that were surveyed, (b) map of Sarawak showing land use zones; circles denote the location of majority of smallholders/communities and civil society organizations that were covered by the survey (Map source: hutanwatch.com/maps).](image)

Smallholders and communities covered in the survey were clustered in three regions: 1) Miri-Baram river-Ba’Kelalan, 2) Kuching-Bau-Sabal, and 3) Engkari-Batang Ai. They either practiced small-scale timber-agroforestry or own timber stock on their community lands (e.g., temuda, tembawang). Active, continuous planting of timber trees was exclusive to those earning income from other sources and owned the land. The common timber species on their lands were engkabang, belian, meranti, kelampayan, kapur, as well as gaharu, rubber and durian. For short- and medium-term income, coffee, vegetables,
banana, cempedak, petai and bamboo were grown and sold to local market. In many cases, the farmers and communities were assisted by CSOs to practice sustainable agriculture.

3.2 Smallholders and communities’ interest in cultivating and producing timber
A significant majority of respondents (80%) agreed, to different extent, that smallholder farmers and communities are interested to produce timber commercially (Figure 2). This interest covered several processes associated with timber production such as sourcing/collecting seeds of timber species, growing those in the farms, maintenance, harvest and post-harvest processing. The interest was strongly associated with the potential income that could be generated along the chain of production, although the profitable business model and cost benefit analysis remained to be explored. Access and ownership of land were the important factors in determining whether community members are interested in cultivating, maintaining and harvesting timber.

Respondents that slightly disagreed (11%) or disagreed (6%) cited conservation and protection objectives for standing timber trees, as well as law prohibition on commercial use of timber, as the main reasons behind the lack of interest to produce timber commercially. One respondent insisted on having no interest in harvesting timber on their land due to their love of forest and its ecosystem services. In the areas where planted timber trees had matured, some communities focused on wildlife enrichment for ecotourism purposes and harvesting non-timber forest products.

3.3 Smallholders and communities’ capacity to supply timber
A majority of respondents (66%) agreed, to different extent, that smallholder farmers and communities have the capacity to produce timber commercially (Figure 2). The capacity varied greatly across and within communities. Capacity building initiatives targeted to local needs will benefit the local communities and smallholders, since they are known to pick up new skills (which are relevant to their livelihood) quickly.

3.3.1 Horticulture/silviculture knowledge and skills. Communities and smallholders demonstrated in-depth knowledge and skills related to sourcing timber seeds from mother trees and tree identification and selection. They experimented with planting different species mixture (timber and crop) with varying degrees of success [8]. They require assistance in: 1) setting up nursery facilities and infrastructures, 2) horticultural training - preparing for seed collection before mass fruiting, proper seed collection and processing, nursery maintenance, and plant propagation (e.g., cutting technology), and 3) silvicultural training - maintenance of planted timber seedlings, configuring a proper species mixture based on wood quality and farm profitability [12].

3.3.2 Timber-harvesting and processing ability. The ability to harvest and process timber was limited to few members of the communities, particularly those who were directly involved in timber products (boat, woodcarving, wood planks, furniture, door frames, sape) or had experience working in the logging
industry. Generally, timber harvesting was done in a selective manner to minimize damages to surrounding trees, maintain continuous supply of timber from their land and allow tree regeneration – although overexploitation could take place in the absence of safeguards. They knew how to fell trees and mill planks using tools in hand such as axes, saws and basic/advanced chainsaws. For those equipped with decent machinery and infrastructures, they were able to produce good quality wood which were suitable for government building projects, hotel/tourism industry and local markets. Additional support to procure good chainsaws or mobile mills can increase efficiency and wood quality especially for communities in very remote areas, and also allow them to obtain high prices.

3.3.3 Market access. Currently, an informal economy existed where timber and its products were traded within communities and between communities. In this setting, the buyers generally knew who to refer and from whom to purchase or commission certain timber products (planks, boat, longhouse etc) according to their budget. There seemed to be a self-regulating mechanism within the communities, where timber harvest to meet buyers’ demand was being monitored by community members to avoid overexploitation [11]. However, there were many incidents where the sellers were not paid fairly since they were not aware of the timber market rates. They also lacked the power to negotiate better prices.

3.4 Smallholders and communities’ familiarity with timber licensing process

Under the current informal economy, timber production and trading by smallholders and communities were not yet regulated. There was no particular licensing arrangement or appropriate legal framework to accommodate these types of timber production. Hence, it was not surprising that a huge majority of respondents (75%) viewed that smallholder farmers and communities are not familiar with the process of timber licensing (Figure 2). Nevertheless, they were aware of the regulation related to forest use and the limitations imposed by the government [13]. Many rural communities were illiterate and were not familiar with government processes. A sensible policy must take into account these challenges and design a system that is appropriate to rural communities’ capacity and agencies.

3.5 Barriers to smallholders and communities’ timber production in agroforestry systems

3.5.1 Legal framework. The existing legal framework in Sarawak prohibits any commercial use of forest in forest reserves and communal forests. Instead, only domestic use or personal consumption is allowed [13]. This framework exemplifies the good aspiration of balancing communities’ livelihood and forest conservation; however, it is no longer relevant to the communities today. The ongoing depletion of forest resources severely affected their livelihood e.g., communities resorted to outsourcing timber from sawmill [14] - this signals that the current framework is ineffective. Alternative arrangements have been proposed, which include a motion to create and administer a smallholder licence that will enable communities to participate in small-scale timber trading. The minimum size of this licence is 100 ha. This proposal has the potential to overcome legal barriers for smallholders and allow them to participate in the legal chain of custody (CoC) of timber production. Many respondents welcomed this proposal, although they expressed concerns on the licence execution; particularly on the risks of further exploitation of remaining timber stock on communal land and land grab/disputes.

3.5.2 Financial viability. Timber has a long gestation period, thus posing financial challenges to landowners. Many respondents recognized the need to provide support to smallholders and communities to generate short-, medium- and long-term incomes; such outcomes can be delivered by well-designed timber-agroforestry systems [1,6,15]. One advantage of adopting timber-agroforestry is that the communities were often doing multiple jobs and hence they can easily manage timber and crops in parallel. There was also a financial barrier associated with lack of capital to purchase materials, equipment and manpower along the production chain. The initial cost of setting up a timber-agroforestry system is high, and the machineries required to harvest and process timber can be costly. Hence, the benefit of timber-agroforestry might not be far-reaching, rather it is limited to those with financial surplus or other income streams.
4. Recommendations to facilitate timber production via timber-agroforestry in Sarawak

4.1 Provision of resources targeted to community’s needs and aspirations
Depending on their current capacity, specific support could greatly advance communities and smallholders along the production chain. Capacity-building workshops, financial assistances/loans, administrative/legal assistances and land access, can improve horticultural, silvicultural and timber-harvesting skills that many of them currently lack. More importantly, the resources must be tailored to individual communities with respect to their readiness and capacity to embrace sustainable, small-scale timber-agroforestry production. The resources can be channelled via existing government extension agencies, or via public-private partnerships that include big timber plantation/logging companies.

4.2 Value addition and market access
Our study established that communities do have the capacity to produce timber commercially. However, there is a big gap in producing value-added timber products. Upskilling e.g., technical training on timber milling and processing and in situ product research and development could innovate the small-scale industry and create job opportunities. The industry should take advantage of the growing consumer base of homemade/artisanal products made by rural communities. Connecting small-scale producers with market, where they are empowered to negotiate price, access finance and market information, can help them sustain livelihood from timber-agroforestry.

4.3 Communities of practices
Timber-agroforestry systems are unique and require trial and error to achieve a suitable combination of species that yields profitable incomes. The experience and struggles of farmers are valuable assets to the community. By participating in a network of practitioners, members have access to existing resources (e.g., ASEAN Guidelines for Agroforestry Development 2018, traditional ecological knowledge), practical solutions, market information and social support. The community of practices offers grassroots’ voices and ambitions - which is crucial in an inclusive and participatory forest management.

4.4 Regulation on the proposed smallholder timber licence
Communities and smallholders understand the essence of sustainable timber production and how it affects their livelihood in the long term. A strong governing community that self-regulates its timber use is ideal, however there remains opportunity for overexploitation. Hence, safeguard mechanisms that integrate local customary law/ adat in order to harmonize community’s longstanding governance and tradition will be needed [8, 11]. These safeguard mechanisms may take the form of established Forest Management Certification schemes, such as the Malaysian Timber Certification Scheme (MTCS) and Forest Stewardship Council (FSC). Example includes the FSC certification for small and low intensity managed forest (SLIMF). Feasibility studies are needed to assess potential challenges that might be faced by smallholders in meeting the standards set by the schemes. Depending on the results of such studies, the Malaysian-based scheme might need to be adjusted to accommodate smallholders.

5. Conclusion
The inclusion of smallholders and communities in sustainable forest management, via timber-agroforestry system, has huge potential to meet, in part, the timber industry’s demand and sustain rural economy while enhancing biodiversity and food security. The practice of timber-agroforestry is aligned with Sarawak’s Post COVID-19 Development Strategy 2030 and is acknowledged in the Economic Planning Unit as a viable strategy to revitalise rural communities. Agroforestry practitioners possess valuable skills relating to timber cultivation, harvest and processing – they are also fast-learners and resourceful. With tailored assistances and facilitations by the government, CSOs and industry, agroforestry practitioners can scale up or move up the production chain and provide greater economic and environmental benefits to Sarawak and the region.
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