
The Use of Small Portable Sawmills In Forest Management in Papua New Guinea

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Summary

Many changes are taking place within the Papua New Guinean forestry sector. One of these changes is the use of the 'wokabout somil', a small, locally constructed portable sawmill, by forest-owning groups and individuals. This paper attempts to assess their ecological and economic sustainability. The little information available indicates that wokabout somil operations may be sustainable if certain conditions are met: the owners need to identify themselves as guardians of the forest; silvicultural interventions such as felling rules and enrichment planting must be implemented; training should be improved and extended to more forest owners; backup services need to be expanded; marketing improved; and a monitoring system put in place. Non-governmental organisations in Papua New Guinea have started to address these issues, but as yet can only reach a small proportion of the over 500 mill owners. One should, therefore, be cautious about promoting the further unlimited and unconditional distribution of the wokabout and other portable sawmills to local communities. At the same time, the impact and operation of the mills needs to be studied on a much wider scale, to be able to confirm or deny the findings of existing case studies.

Introduction

Conventional logging operations in Papua New Guinea (PNG) commonly harvest selected mature trees using heavy machinery to extract the logs, and have no harvesting or silvicultural system in place. Many landowners and non-governmental organisations (NGOs) perceive the benefits of these conventional operations to be insufficient to compensate for the environmental degradation and social costs incurred. They have, therefore, started to harvest and process local trees using

different types of portable sawmills. The most common of these mills is the 'wokabout somil'. It consists of a metal beam on a frame, along which a circular saw with two perpendicular blades moves. The whole setup can be dismantled and carried on foot. It was introduced by missionaries in 1983/84, primarily to help remote villages to build schools, aid posts and churches, and to improve the quality of rural dwellings. Its potential for sustainable harvesting of the natural forest was soon recognised (Sargent & Burgess, 1988), and manufacture of the wokabout somil was taken up locally. The producers claim that the mill is environment-friendly and can, therefore, become a tool in sustainable forest management. They also claim that, per cubic metre of timber cut, use of the wokabout somil brings greater monetary gains to villagers than the sale of trees to logging companies. An additional benefit is that, by harvesting the forest in this way, villagers themselves will be able to determine where, when, what, and how much to cut. To date, over 500 wokabout somils have been sold in PNG, of which about 70% are estimated to be in production (FSP-PNG, 1995).

Sargent and Burgess (1988) expressed concerns that widespread, uncontrolled use of the wokabout somil might lead to uncheckable environmental damage. Further doubts are raised as to whether the wokabout somil actually addresses the environmental and economic concerns of landowners and NGOs by reducing forest degradation and bringing long-term benefits to villagers in PNG (IIED, 1991, Louman, 1992).

This paper attempts to answer these questions and explores whether people have actually opted for the wokabout somil in preference to conventional logging.

Mill Owners and the Benefits they Expect

Three categories of mill owners have been recognised in PNG (Louman, 1992).

The first category consists of individuals and business groups who purchased the mill as a business investment, and who may or may not own the forest they harvest. They perceive the mill as a source of income and an attractive investment, as long as its returns are compatible to those of other commercial investments. Present earnings are considered more important than future earnings, resulting in low-cost and more destructive harvesting practices. Many mill owners fall into this category. They are particularly found in forest areas previously opened up by conventional

logging operations, and with good access to population centres.

The second category consists of customary organisations which purchased or received wokabaut somils for village development activities. Trees are harvested to meet local needs. Often these groups are heavily subsidised by missions and NGOs and, therefore, do not worry about the cost-effectiveness of the operation. Their impact on the environment is often temporary and their harvesting practices are less intensive. The 1993 Papua New Guinea portable sawmill survey suggests that this category is relatively small (FSP-PNG, 1995).

The third category is in between the above two extremes. Within this category, some groups and individual owners lean towards commercial use of the forest, with an interest only in short-term earnings, while others lean towards more 'conservative' harvesting. This is the largest category of mill owners, and consists primarily of groups based on customary forms of organisation that employ restrictive tree harvesting practices in order to maintain the forest for future generations. Only an estimated 2% of all categories of mill owners, however, use a forest management plan (FSP-PNG, 1995).

An example of such a customary group is found in Bau village in Morobe province. Under the guidance of a local NGO they manage several wokabaut mills. They have formulated a land use plan, indicating areas for agriculture, conservation, ecotourism and timber production. Initially they produced timber to improve local buildings (church, community hall, school) and for sale at the local market. Later they entered into a marketing agreement with the Eco Trading Company in the UK for the export of sawn timber. Due to transport and timber quality problems, only a limited quantity has been exported, but at much higher prices than timber sold locally. The villagers perceived the benefits from the wokabaut somil operations to be in the form of provision of timber for construction, income, and an increased sense of self-determination (Hill, 1991). In addition, it gave the village a high international profile, being one of the first groups in PNG to produce 'eco-timber'. Thus, donors were willing to support related income-generating activities.

The Impact of the Wokabaut Somil on the Forest

Mills owned by village groups with a primary goal of enhancing community life

through improved buildings, are likely to be operated at lower intensity than those primarily geared towards commercial production. Consequently, their impact on the forest is usually small, localised, and temporary. On the other hand, instances have been reported of felling on steep slopes (over 30°) and in forest reserves (FSP-PNG, 1995). These were mainly operations of individual wokabaut somil owners producing for the local market. The impact of forest operations owned by the third category of forest owners varies with the importance of the commercial goals, and ranges from low-intensity harvesting to local clear-felling. In general, the environmental impact of all portable sawmills surveyed (including mills other than the wokabaut somil) was minimal ‘although it would seem that this outcome is fortuitous rather than planned’ (FSP-PNG, 1995, p. 45). However, the environmental impact assessed by this survey (by the Foundation for the Peoples of the South Pacific (FSP)), was limited to a very narrow investigation of the adherence by operators to standard regulations (eg. concerning cutting on steep slopes or within 50 m of watercourses).

Louman *et al.* (1995, 1996) studied the impact of an individually owned, commercially oriented wokabaut somil operation on seasonally flooded forest in the lowlands, near Lae in Morobe Province. They looked at the residual stand, regeneration, and the soil seed bank, before and at different time intervals after the operations. The wokabaut somil operators had several years experience, and had received some technical and silvicultural training from the Village Development Trust (VDT), one of the major NGOs providing training in sustainable forest management in PNG and the South Pacific. A comparison was made with a conventional operation in similar forest, where approximately 20 m³/ha had been extracted by a professional team, using chainsaws and a bulldozer. The mill owner in the latter case could be grouped into the third category – having commercial objectives, but also being aware of the need to operate in a more sustainable manner.

The study revealed that the wokabaut somil operation removed a greater number of mature trees (> 50 cm diameter at breast height), leaving more trees in lower diameter classes (10-40 cm) than the conventional operation. Regeneration after the conventional operation was more abundant but consisted of fewer different species. This indicates that the conventional operation created less heterogeneous and more degraded environments than the wokabaut somil operation. The difference can be attributed to the use of heavy machinery in the conventional operation. In neither case, however, was regeneration sufficient to guarantee a future crop in 80 years

time. The soil seed bank was only studied in the wokabaut somil operation, and was found to be virtually devoid of tree seeds. Therefore, though the overall damage caused by the wokabaut somil appears to be less than that caused by the conventional operation, neither operation is ecologically sustainable without specific silvicultural interventions. Studies covering more operations over longer periods of time are needed.

The site under study was part of a former concession area which had not been logged due to seasonal flooding and its proximity to a major watercourse. Such sites should preferably remain unlogged but, recently, forest owners have sold the remaining trees to contractors without any formal logging agreements. This will disturb the forest environment far more than wokabaut somil operations.

Another aspect of the commercial operations which is causing unnecessary damage to the forest, is the generally low recovery rate. This varies from less than 10% for heavy timber, such as Kwila (*Intsia* sp.), to more than 50% for species from the genera *Artocarpus*, *Mangifera* and *Myristica*. Average recovery rates of around 35% are reasonable for the type of mill, but low in comparison to high-tech mills. In addition, most of the sawn timber produced is of low quality due to over- and under-sized cuttings (Kupal, 1994). This is due to lack of technical skills and poor maintenance of the machines. Improvements in these areas could increase the recovery rate and reduce the pressure on the forest.

Wokabaut Somil or Conventional Logging?

In both the Bau and Lae cases, forest owners preferred wokabaut somils over conventional logging. Several other owners also chose self-harvesting above selling their trees to large logging companies. One forest owner near Lae has been particularly successful and has expanded his operations beyond the forest owned by his clan group. He now employs two wokabaut somils as well as one of another type of portable sawmill, which produces a higher quality and greater quantity of timber than the wokabaut somil (Zibe, 1995).

In many cases, the interest lies in combining the two operations: large-scale logging to acquire facilities and services for the community as a whole, and wokabaut somil operations to provide longer-term income opportunities for individual forest-owning groups. In the short term there will be few environmental benefits from such

wokabout somil operations, as they cannot reduce the impact of larger companies on the environment. However, if these small-scale operations can generate a sustained forest-based income then, in the future, forest owners may refrain from selling their trees to logging companies. In addition, with training and education, they will obtain the knowledge and experience to manage their forest in a sustainable manner. In the long term, this will help to guarantee preservation of the forest.

Is the Wokabout Somil Operation Economically and Ecologically Sustainable?

Much more information is required to answer this question. Wokabout somils purchased for commercial purposes may become economically successful operations. With increasing profits and demands, forest owners look for equipment that produces a higher volume and quality of timber. Under conditions of increased productivity, ecological sustainability can only be achieved if operations are planned and silvicultural principles applied in both harvesting and forest management. It is essential, therefore, that the wokabout somil stage is used to train the operators, and increase their awareness of the importance of planning and forest management.

Often, both economic and ecological sustainability depends on the market. The most successful operators either worked mainly to assist remote villages in improving their dwellings and constructing schools, aid posts, and churches (in which case they were usually heavily subsidised), or had ready access to a reasonably secure market, to which they could sell a large range of different species, either as rough sawn timber or pallets. Many owners, however, have problems in finding good markets, because of the irregular quality of their products, and market demand for specific species and product quality. As a result, many wokabout somil operators select the species and quantity of trees to be cut in response to demand, rather than following a carefully prepared management plan.

To overcome the marketing problems, several local NGOs have set up schemes in which wokabout somil owners can sell their rough sawn timber to a central processing facility, which upgrades the quality of the end-product where necessary, and reprocesses the timber into furniture and other products. The same schemes also address the potential problems of forest management and unsustainable operations by requiring that all participants take training courses in forest

management, and by monitoring the operations. Only if their operations are approved, can wokabout somil owners sell their timber to the processing facility.

An important aspect of bringing increased welfare to the local people is the distribution of income. Employment is one way of achieving a wider distribution of income. With an average employment of seven people per mill, wokabout somils employ more than 2,400 people in the country. All types of portable sawmills combined, employ more than 7,000 people (FSP-PNG, 1995). This compares well with the estimated 7,500 people formally employed in the forestry sector in PNG (NFA, 1993).

Conclusion

Can the use of wokabout somils stop or reduce forest degradation and bring long-term benefits and greater independence to villagers in PNG?

Little information is available on the success rate and impact of village wokabout somil operations, the primary objective of which is the improvement of village constructions. Observations indicate that these operations are of low intensity and often temporary, causing little damage to the forest. A case study showed that wokabout somil operations leave more young trees and a more diverse residual forest than conventional operations, basically due to the use of heavy machinery in the latter operations. However, wokabout somils owned by individuals for commercial purposes have been reported to cause local environmental degradation. Nevertheless, studies suggest that even these operations have the potential to be silviculturally and economically sustainable, as long as attention is paid to a number of factors. These include post-harvest silvicultural operations; additional technical training of the operators to improve timber quality; improved mill design to increase efficiency; improved back-up services; improved marketing facilities; and monitoring of the where and how of the operations. The formulation and implementation of forest management plans would be an important step in the right direction.

In some commercially successful operations, the wokabout somil has been replaced by mills that produce more timber of better quality. Since this can increase the pressure on the forest, it is essential that the owners and operators of such mills are well aware of the consequences of haphazard harvesting on their resources, and

receive the training and marketing support outlined above.

In PNG, several NGOs are addressing these issues by offering support for marketing and further processing, and providing training and monitoring facilities. For the moment they can only reach a small proportion of the owners of the more than 500 mills sold over the past decade. However, unlimited enthusiasm for production and distribution of the wokabaut somil (or any other portable sawmill) in the name of 'environment-friendly operations' and 'more money in the pockets of the forest owners', without a dramatic increase in such support, could make these operations as unsustainable as conventional logging operations, albeit causing forest degradation on a much smaller scale.

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