



Business Models for the Restoration of short-rotation Acacia plantations in Vietnam

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0 SUMMARY

Vietnam's forest cover has increased impressively since 1990, when only 27.2% of the land was covered with forests. In 2015 forests once more covered 42% of Vietnam (app. 14 Mio. ha) as a result of massive reforestation activities – mainly with short-rotation plantations – with the aim to further increase this area to 47%. These plantations have played a decisive role in Vietnam's forest transition (reverting forest cover loss), and currently cover more than 3.5 million ha, expected to increase to 4.1 million ha of land by 2020. Acacia, the dominant tree species in plantations, has enabled this success story, because as a nitrogen-fixing species it was necessary for the rehabilitation of heavily degraded soils and barren lands. In addition it provided a quick, though low-return, business model based on a reliable supply chain for wood chip production by state forest companies, communities and small holders.

A number of reasons support the assumption that Vietnam is now ready for taking the next major step in its forest transition: to significantly improve the quality of its forests, in order to enhance their economic performance and environmental services. With increasing prices for labor, the already low-profit acacia production for wood chips will even be less attractive in the future. Although timber production takes longer, there is a clear demand: Vietnam will need significant amounts of legally produced timber for its well-developed export-oriented furniture industry, but currently the forest sector cannot cope with the demand and has to import up to 80% of the timber used for export products.

Vietnam is also very committed to implement REDD+ and use its forests to reduce anthropogenic greenhouse gas (GHG) emissions as a contribution to mitigate climate change (Pistorius, 2015). When REDD+ emerged it was considered a new approach that complements Vietnam's ongoing activities, and thus was welcomed early on by the Vietnamese government (Hoan & Catacutan, 2014). Last but not least, short-rotation Acacia plantations have low resilience against the increasing impacts of extreme weather events and pests, presenting a major risk to the forest owners that depend on this land use as an important income source.

The main objective of this project is to develop appropriate and feasible business models that effectively mitigate forest sector GHG emissions in the context of REDD+ while promoting financially viable land-use alternatives. For these purposes the project team – consisting of *UNIQUE forestry and land use*, *Climate Focus* and *IREN of Hue University* – is identifying, assessing, conceptualizing and implementing the models described below-for Vietnam's forest sector that promote the restoration of Acacia plantations. Our models promote sustainable forest management and focus on two main activities:

- increasing the rotation length to make it suitable for sawn log production; and
- the stepwise introduction of marketable high-value native species in existing acacia plantations.

Through these activities, the existing Acacia business model can be replaced by significantly more profitable business models focused on producing high-value timber for sawn logs. After having assessed the technical, financial and market feasibility of these models we have identified pilot forest enterprises that wish to implement them, based on their circumstances and priorities. Although the models are relevant for the entire country our project focuses on REDD+ pilot provinces, in particular those in NorthCentral Vietnam, which is the pilot region for the FCPF Carbon Fund Program. Another important objective of the project is to develop a comprehensive upscaling strategy, which aims to promote the model throughout the country, firstly to other state forest companies and in the long run also to other forest owners through the development of extension models. The strategy will address options on how to overcome technical challenges and financial constraints.

1 BACKGROUND

Vietnam has achieved remarkable success in increasing its forest cover since 1990, when remaining and severely depleted forests only covered 27% of the country. The most recent Forest Sector Development Report (MARD 2015) provides a comprehensive overview of the progress made towards achieving the forest-related policy objectives outlined by the Forestry Development Strategy 2006–2020 and the National Action Plan on Green Growth 2014–2020. According to this report, forest cover has increased to 41.5% in 2014, progressing towards the national target of 47% forest cover by 2020 (MARD 2007). All three forest categories have gained in area: production, protection and special-use forests explicitly dedicated to biodiversity conservation.

At the same time, the main emphasis in this transition has been on establishing plantations of which a significant share is used for wood chip production (Harwood & Nambiar 2014), a well-established and functioning but low-profit value chain (Harwood 2011, MARD 2015). Meanwhile, only 8% of the forests in Vietnam can be classified as “rich and medium rich natural forests” (MARD 2015). As a consequence, the economic performance and the environmental functionality of Vietnam’s forests are still very low: approximately 33% of Vietnam’s forests are degraded and of poor quality (Pham et al. 2012) as the result of exploitation and overuse of soils.

Plantations in production forests have played a crucial role in Vietnam’s forest transition, and currently cover more than 3.5 million ha. By 2020, it is expected that plantations will cover more than 4.1 million ha of land (MARD 2015), and that they will reduce the pressure on natural forests while also producing timber to help reduce Vietnam’s reliance on timber imports. Plantations are operated by various user groups in Vietnam including individual households and small-holders (46%), state management boards (17%), state forest companies (15%), provincial peoples committees (12%), private companies (4%) and other users (6%) (Nambiar et al. 2014). Acacia, a fast-growing leguminous tree species native to Australia, is the predominant species for plantations used in Vietnam. It has been extensively planted in the last two decades, and the trend still continues. In 2014, pure Acacia plantations covered more than 1.1 million ha but this figure seems to underestimate the real amount (Amat et al. 2010; Nambiar et al. 2014).



Fig. 1: Wood chip mills in Thua Thien Hue

The reason for the successful introduction and rapid expansion of Acacia are

- The simple technological requirements for production;
- A well established and functioning – though low profit – value chain;
- The suitability to plant even on heavily degraded soils and barren lands: Acacia with its nitrogen fixing properties significantly improves soil quality.

Acacia is, compared to other species, a relatively short-term investment as it can already be harvested for pulpwood and wood chips after 3 to 7 years, and for timber after 9 to 15 years. Currently, over 10

million m³ is harvested annually from Acacia plantations.¹ A large share of the production is processed as woodchips, although Acacia for sawn timber enjoying high demand from the export-oriented (garden) furniture industry, which has to currently import approximately 80% of the logs required for production (Phuc & Canby 2011). Despite higher revenues for timber compared to wood chips, many forest owners are reluctant to increase the rotation length, for three key reasons:

- The risk for root diseases, pests and storm damage (monsoon and typhoons) increases significantly, especially for the predominantly-used Acacia hybrid.
- Many forest owners still depend on the income to cover their living costs and salaries; shifting to longer rotations (and other species) results in significant liquidity gaps.
- Lack of technical capacities needed to manage the transition.

Without disputing the merits of Acacia for Vietnam's forest transition, there are challenges and concerns associated with the abundance and expansion of Acacia monocultures in Vietnam. These challenges provide good arguments for taking the next major step – restoring the original quality of Vietnam's forests. First, their low economic performance does little to support the objective to contribute to rural development and poverty alleviation (in the context of the increasing gap between average incomes in urban and rural areas). Secondly, Acacia plantations are increasingly affected by severe weather events and biotic calamities and pests. Their resilience against climate change is low and needs to be improved through suitable management measures. Last but not least, current Acacia plantation management leaves much room to enhance the delivery of ecosystem services, provided they are enriched with native tree species and managed sustainably – this concerns in particular the potential of carbon sequestration in the context of REDD+ (Pistorius, 2015).



Fig. 2: Acacia plantation in TTH after typhoon

Vietnam has decided to implement REDD+ and has formulated ambitious targets for the land use sector in its Intended Nationally Determined Contribution (INDC) to the UNFCCC, as well as in its reference level for REDD+ submitted in January 2016.² Although deforestation rates are already low, Vietnam is internationally very committed to further mitigate its forest sector emissions while simultaneously improving the economic and environmental performance of production forests. Converting and restoring Acacia plantations for wood chip production appears to be a promising option for simultaneously addressing the challenges described above. Two principle strategies exist: first, to increase the rotation length and target dimensions, and secondly, to diversify plantations through the introduction of high-value indigenous tree species.

¹ Exact harvesting values are unknown due to great variation in small-holder reporting (Nambiar et al. 2014)

² <http://redd.unfccc.int/submissions.html?country=vnm>

2 VISION, OBJECTIVES AND APPROACH

Today, the economic and environmental performance of short-rotation Acacia plantations in Vietnam is low, and with significantly increasing prices for labor, it is prone to further decrease in the future. Thus, it is a declared policy objective of Vietnam to shift towards sustainable and economically more attractive business models in production forests. Improved forest production schemes and corresponding value chains will increase the profitability of the sector in the long term, and also generate options for improving the livelihood of communities and smallholders through respective out-grower schemes. At the same time, approaches that increase the standing stocks represent a key option for Vietnam's REDD+ performance (sustainable management of forests, enhancement of forest carbon stocks) – in particular since today deforestation only plays a subordinate role.

The key objective of this project is to develop appropriate and feasible business models³ that effectively mitigate forest sector GHG emissions in the context of REDD+ while promoting financially viable land-use alternatives. For these purposes the project team – consisting of *UNIQUE forestry and land use*, *Climate Focus* and *IREN of Hue University* – is identifying, assessing, conceptualizing and implementing the models described below with a view to promoting the restoration of Acacia plantations. Our models promote sustainable forest management and focus on two main activities, which together are expected to significantly increase the profitability of forests designated for production:

- increasing the rotation length to make it suitable for sawn log production; and
- the stepwise introduction of marketable high-value native species in existing Acacia plantations.

These activities are expected to help to significantly increase the profitability of production forests and provide a future resource base of legally produced timber for Vietnam's export-oriented furniture industry. Through the activities described, the predominant existing business model of plantation owners (producing and selling short-rotation trees for chip wood) would be replaced over a longer time period by new silvicultural and forest management approaches that focus on producing high-value timber for sawn logs.

After an initial scoping mission in North Central Coast (NCC) Vietnam in July 2014, we introduced the project to MARD (DOSTIC) and the Vietnam REDD+ Office (VRO); in addition we discussed our approach and models with the Forest Carbon Partnership (FCPF VN) managed by the World Bank, the UN-REDD program Vietnam and other relevant organizations how this concept can align with and

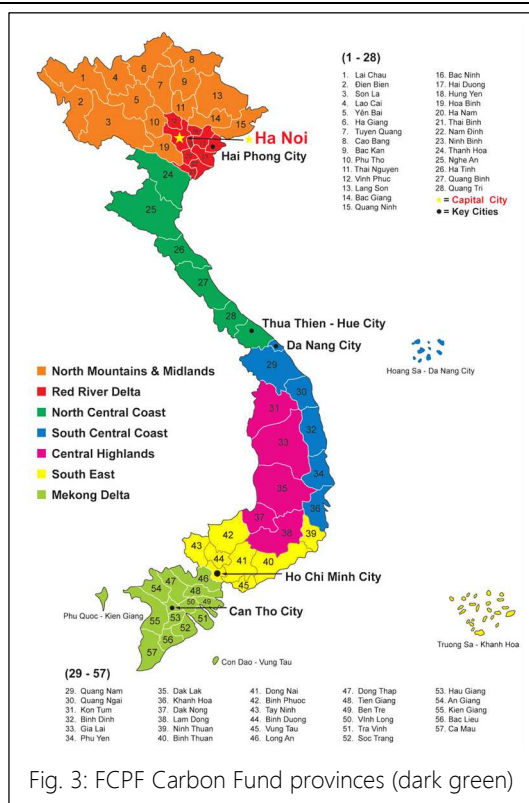


Fig. 3: FCPF Carbon Fund provinces (dark green)

³ A business model is defined as the rationale of how an organization creates, delivers, and captures value, in economic, social, cultural or other contexts.

support existing forest sector initiatives and policy developments. In this context it was confirmed by MARD that the most appropriate area for developing and piloting the models is the NCC agro-ecological region of Vietnam. The provinces in this region have a large amount of area covered with Acacia plantations, and the World Bank, KfW, GIZ and other institutions have carried out a number of relevant activities and projects here related to the model. In addition, the six provinces from Thua Thien Hue to Thanh Hoa currently develop Vietnam's FCPF Carbon Fund program in the context of REDD+; in this context the models are highly relevant options for contributing to the mitigation performance that constitutes the basis for ex-post results-based payments.

In the same way that Acacia was first introduced by State Forest Companies (SFCs) and Forest Protection Management Boards (PFMBs), and then introduced to communes and small-holders, we also seek to use the existing capacities of these organizations for piloting our models. Long-term options for also working with local smallholders and implementing the models through outgrower schemes will be explored in the context of the up-scaling strategy.

After first analyses had confirmed the high economic viability and potential for implementation, during the second phase the consortium has assessed in detail the feasibility and expected economic, environmental and social benefits of the business models. The results were presented in various workshops (in Ha Noi, Quang Binh, and Thua Thien Hue) to representatives of SFCs, PFMBs, government institutions and donor agencies. In October 2015 a conference was held in Hue with representatives of MARD, JICA, GIZ, KfW, FCPF and UN-REDD, and SFC / PFMB directors from Vietnam's eleven REDD+ pilot provinces. At this occasion six organizations confirmed their interest to act as our pilot partners for implementing the proposed models, based on their priorities and local circumstances:

1. Song Hung PFMB (Thua Thien Hue)
2. Tien Phong SFC (Thua Thien Hue)
3. ForexCo SFC (Quang Nam)
4. Thy Son PFMB (Binh Dinh)
5. Song Huynh PFMB (Phu Yen)
6. Dak To SFC (Kon Tun)

3 THE MODELS AND THEIR FEASIBILITY

Based on an extensive review of existing literature, several field visits, and consultation with several experts, initially we defined a set of potential native tree species to successively replace Acacia. Following a site-species-market approach that matches the technical and market feasibility of the model, we have identified three native species, namely *Tarrietia javanica*, *Dipterocarpus alatus*, and *Hopea odorata* that are particularly suitable for the proposed business models. There are significantly more, a total of 194 native species has been identified for all climatic zones of Vietnam. However, only few species meet the criteria needed to be suitable for the proposed business model. Of these the above-named are the most promising for an economically profitable

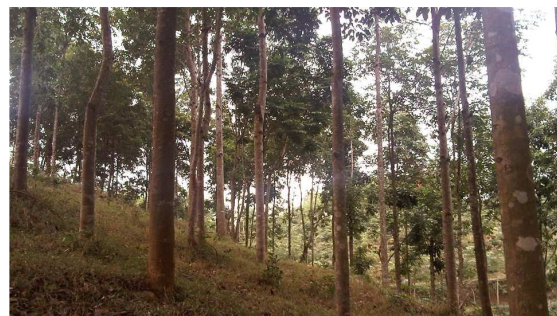


Fig. 4: 14 yr. old *Tarrietia* stand without treatment

transition within a reasonably short period of time. They have a good growth potential, are adapted to the biophysical conditions in North-Central Vietnam, and produce good quality, marketable timber. Furthermore, there have been preliminary activities focusing on planting and managing these species, and thus there are experiences that can provide key lessons learned and important insight for planting (e.g. conditions) and plantation management.

As a first step we developed and calculated the reference model – the most common plantation model in North-Central Vietnam: Acacia hybrid for chip wood production in 6-year-rotation periods without any silvicultural management (Model 1, *“Acacia 6 years wood chip”*). Taking into account the specific

requirements of different native species, we then developed different transition models (all on a 1-ha-scale, for comparison), with a special focus on the silvicultural aspects. In the following we present three illustrative transition models, noting that there is a range of other possibilities and that the location of implementation

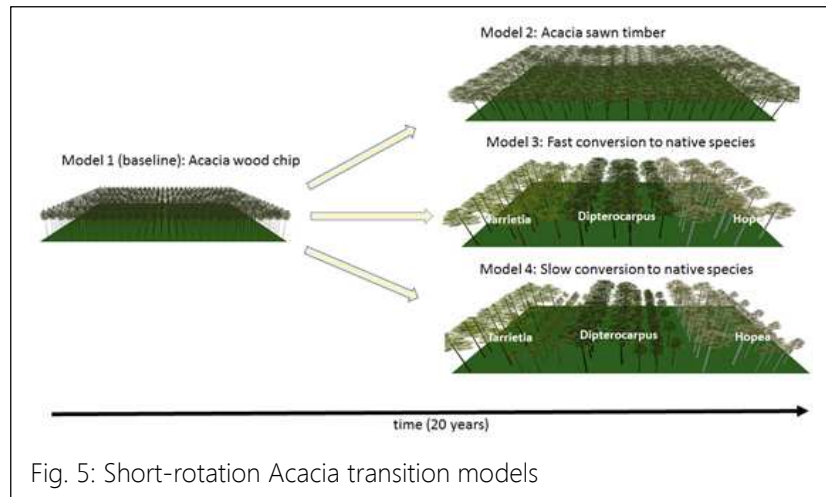


Fig. 5: Short-rotation Acacia transition models

determines which species and which silvicultural approach is appropriate:

- Model 2: Acacia sawlog production in 12 year rotations (*“Acacia 12 years sawlogs”*)
- Model 3 (rapid conversion): Transition of model 1 to mixed native species in year 4 and 6 (*“Fast transition from Acacia 6 years to native in year 4 and 6”*)
- Model 4 (slow conversion): Acacia 2x8 years chip wood transition to native value timber production between year 4 until year 16 (*“Slow transition from Acacia to native in 16 years”*)

We have carried out extensive calculations of the costs and benefits of the business models. For the financial key indicators for comparing the models, we have determined the internal rate of return (IRR) and net present value (NPV) for each model at different discount rates. We used a consistent period of

25 years to compare all business models. The model results strongly depend on the underlying discount rate, which depends on the cost of capital, inflation rate and short-term profits required by investors. It is reasonable to assume a 10% discount rate on average. The calculations clearly show that all three presented models are more profitable than the reference scenario,

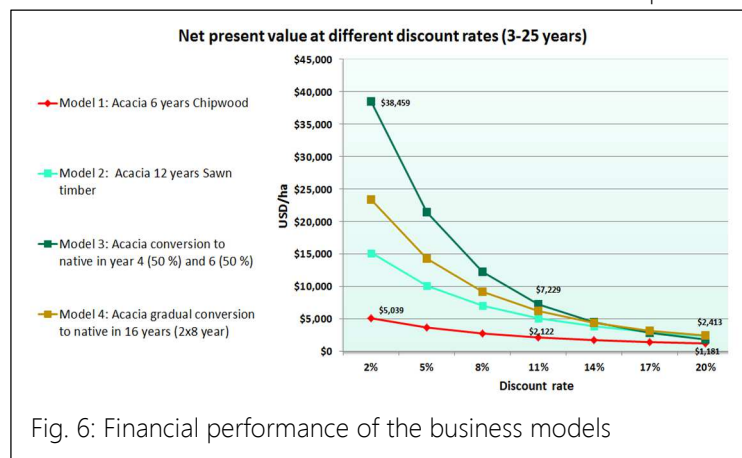


Fig. 6: Financial performance of the business models

and the difference increases with lower discount rates (making native species much more profitable than pure Acacia plantations), and that there are major differences in the profitability of models 2-4.

One key challenge for forest owners who decide to implement the business models will be to overcome the liquidity gap many can be expected to experience in a period of transition, depending on a variety of factors. While SFCs and PFMBs can at least partly draw on existing budget lines, other forest owners have to tap external funding sources. The project team has assessed and will continue to explore different options to address this liquidity gap, also with regards to up-scaling. Besides existing budget lines these include national credit lines for the land use sector, links to the Payments for Forest Environmental Services (PFES) scheme and Forest Protection and Development Funds, the Carbon Fund program and potential options arising from the equitization process of SFCs.

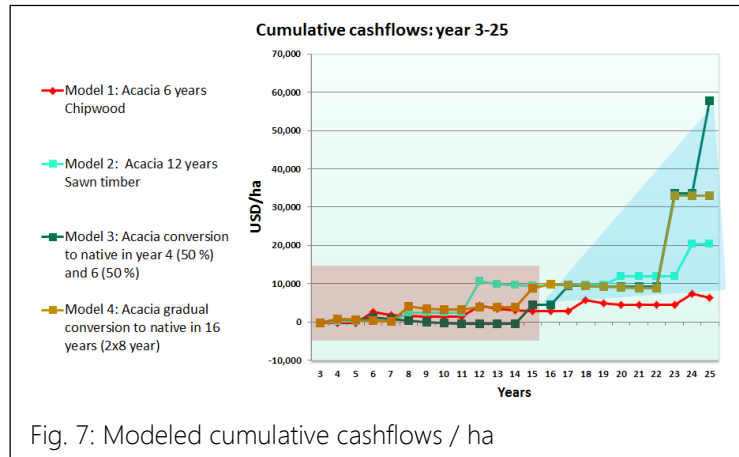


Fig. 7: Modeled cumulative cashflows / ha

Generally, the capability to finance such investments for the future varies greatly and depends on the amount of production forests, whether they are eligible for PFES funding or have access to loans at acceptable conditions. The challenge of financing will be tackled in the context of each of the partners, as well as in the up-scaling strategy.

4 OUTLOOK AND NEXT STEPS

In the current and last phase of the project we will work in three key areas – implementation of the models through direct work with and support of our partner SFCs / PFMBs, development an up-scaling strategy and providing contributions to relevant policy development processes.

First, we will work directly with our partner organizations: after a recalibration and validation of our models, we will develop silvicultural and management plans for the committed area of our partners. If financing needs occur we will help quantifying the financing needs to cover any liquidity gap for the respective forest owner. In addition we will develop suitable trainings to ensure that the transitions can be achieved as planned. In our partner enterprise Soung Hung FPMB we are currently developing a 6 ha demonstration site, in which we are further refining the silvicultural approaches and use them as long-term scientific monitoring plots.

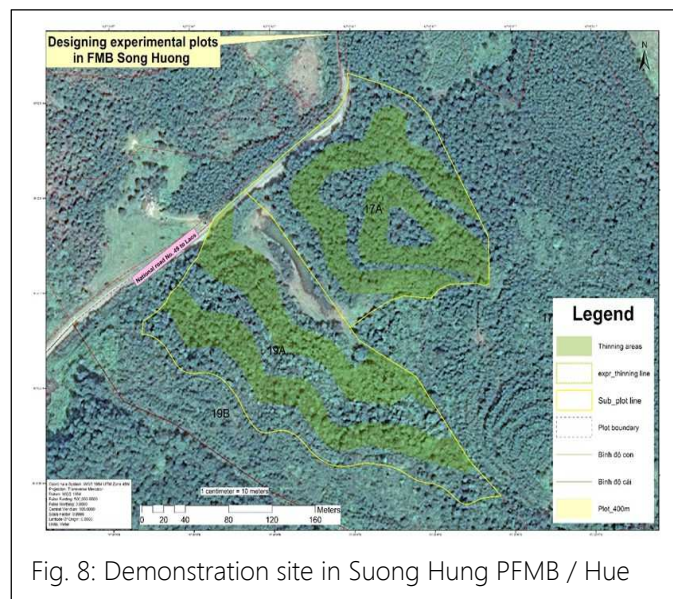


Fig. 8: Demonstration site in Suong Hung PFMB / Hue

The knowledge generated from this pilot site will serve to identify appropriate treatment alternatives

for producing high-value timber. In addition, it serves as a demonstration area for interested stakeholders and forest owners from other provinces (cf. up-scaling strategy).

Secondly, we will develop a strategy for up-scaling the models – in NCC Vietnam and beyond, including to other forest owners. In this context we will continue our efforts to work with provincial governments, in particular those of the FCPF Carbon Fund area. We expect that the models will be of relevance for the Provincial REDD+ Action plans (PRAPs) that are currently under development, and will offer to provide advice and specific input to include respective policy objectives in the PRAPs, as well as to support implementation. Our demonstration area will help to convince other forest owners about the technical feasibility of this transition. The focus of our work will be on Thua Thien Hue province, which is particularly committed in the context of the FCPF Carbon Fund and is supported by JICA. The project team is currently exploring options on how to further enhance the existing cooperation with JICA and DARD, e.g. by integrating the model within Thua Thien Hue's PRAP and providing technical support for committed forest owners.

Last but not least, we will assess options for ensuring political connectivity between the models and relevant national policies and laws, e.g. those currently under revision, such as the Law on Forest Protection and Development, the Biodiversity Law as well as several pieces of secondary legislation (decision, decrees and circulars) with relevance for REDD+ and the proposed business models.

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