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Biological assets as mudharabah-based loan collateral for smallholder farmers in Indonesia: a feasibility study

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Abstract

Lack source of fund is one of the critical issues being faced by smallholder farmers. Despite having teak trees in their yards, such trees as biological assets are not accepted as loan collateral for bank's loan. In average, smallholder farmers fulfil their daily needs by cutting down their teak trees of five years old for sale. This research explored the feasibility of postponing teak harvesting time and analyzed the financial impact. By postponing the harvesting time, it is expected that the growth of the diameter and height of the tree, thus increasing the volume, and the price increases will increase the value of the asset. The method being employed was enterprise budget in which the costs of maintenance, the growth of the trees, and the sales of the harvested trees over time were considered. For the valuation, a profit-sharing as a result of value increases due to harvesting delay is shared between the owner of the asset and the investor through mudharabah financing arrangement. The result suggests that the annual return for the investor (such as a bank) is well above the current interest on a loan, and, therefore, biological assets should be justified as collateral for a bank loan.

Keywords

enterprise budget; loan collateral; mudharabah; smallholder farmers; teak plantation

INTRODUCTION

Teak *(Tectona grandis Linn. f.)* has been considered as a high-value hardwood with its attractive appearance, durability, decay resistance, and easy workability. It is believed that teak plantation was introduced to Indonesia more than 500 years ago from from India, Myanmar, Thailand and Laos (Faculty of Forestry - Gadjah Mada University, 2009). Currently teak is grown well in Java, Lampung, South Sulawesi, Southeast Sulawesi and East Nusa Tenggara.

In the past, most teakwood was planted and managed by government's enterprise, PT Perhutani. Farmers in Yogyakarta Province planted teak trees since 1960's as the main source of long term saving on their dry lands properties (Pramono *et al.*, 2010). In 2007, PT Perhutani produced about 512,000 m^3 per year in Java island whereas in Yogyakarta Province the private teak forest occupied over 58,000 hectares of land without any available production data (Perdana, 2011).

At the present time, most of teakwood is produced from intensively managed plantations due to the limited availability of native teak as well as due to the increasing demand being supported by high selling prices (Hallet *et al*., 2011; Murtinah *et al.*, 2015).

While harvesting time of teakwood from Perum Perhutani take a relatively long period of time, markets require continues supply of such wood (Efansyah *et al.*, 2012). This supply-demand gap in most cases is filled by younger and lower quality of teakwood being planted by smallholder farmers with cheaper price to fulfill their daily need.

In order to increase the value of teak belong to smallholder farmers, the Indonesian Ministry of Environment and Forestry offers another alternative of financing to postpone the harvesting time (BLU Pusat P2H, 2017). However, due to limited fund available, minimum required diameter, and interest on loan, this arrangement is not popular among the smallholder farmers.

The problems being faced to get cash fund from government's financing and, at the same time to avoid having low price of young teak being harvested, the smallholder

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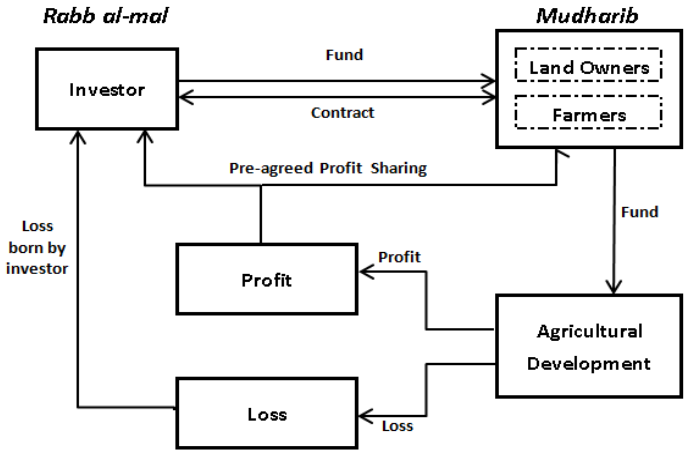

Figure 1.
Mudarabah structure framework

Note: Adapted from Dusuki (2010); Sugiharto and Lestari (2014).

farmers have been forced to fulfill their daily need through loan shark individuals with very high interest rate.

To the extent of our knowledge, there is an absence of an empirical research to assess the feasibility of of providing loan by financial institutions in which teak trees was employed as collateral. To overcome the financial problems by smallholder farmers who have teak trees as biological assets, this research aims to explore the economic feasibility of financing arrangement by way of postponing the harvesting time.

Further, the smallholder farmers also faced problems of having fund to pay interest on loan. Therefore, instead of conventional loan arrangement in which the debtor shall follow a scheduled payment of principal and interest on loan, this research introduce mudharabah profit sharing agreement.

The valuation tool being applied is enterprise budget method in which only two most relevant criteria *i.e* net present value (NPV) and internal rate of return (IRR) have been employed.

LITERATURE REVIEW

Biological assets

The International Financial Reporting Standards (IFRS) section IAS 41 stated that biological assets are defined as crops or livestock owned by entities that obtained from past activities. It should reflect the characteristics of biological transformation, which follows a process of growth, degeneration, production, and procreation that aims to produce new assets in the form of agricultural products.

Biological assets are not depleted and classified in the financial statements as both current assets and non-current assets, depending on the biological transformation period owned by the asset or the period required to be ready for sale. Reconstruction of biological assets valuation in Indonesian agriculture by using IAS 41 was carried out by Kamayanti *et al.* (2014).

Islamic financing structure

There are two common financing structures in Islamic finance, among other are *ijarah* (leasing) and *mudharabah* (partnership). This research is concentrated in mudharabah structure as shown in Figure 1. The *rabb al-mal* (investor) and *mudharib* (land owners and farmers) sign a contract for the development of agriculture with an agreed profit sharing.

The profit being generated out of the project will be shared between the investor, land owners, and farmers, however, if the project experience any loss, the loss will be the responsibility of the investor (Dusuki, 2010; Sugiharto and Lestari, 2014). In Islamic finance, additional collateral beyond the object of the business is not required (Fitriani, 2017).

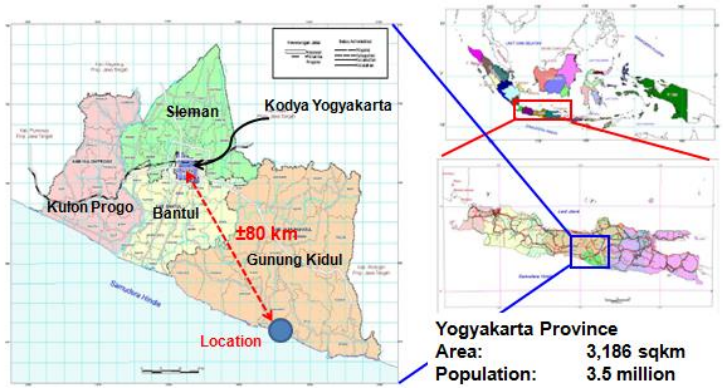

Figure 2.
Research location

Forestry financial valuation

An enterprise budgets approach to value the agricultural development have been published covering different commodities in several parts of the world (Kibirige, 2014). This method had also been applied for forest plantations (McConnell *et al.*, 2016; Purnomo *et al.*, 2016; Frey *et al.*, 2018; Chemuliti *et al.*, 2019). It was found that forest plantations under current market conditions is profitable.

In Indonesia, studies on the feasibility analysis of community forest had been carried out by Widyaningsih and Achmad (2012). In order to achieve a maximum value of the teakwood, Sugiharto *et al.* (2012) proposed a strategy of harvesting time. Further, Sugiharto *et al.* (2014) proposed a more advance of financial analysis as well as the incorporation of financial valuation and social impact for strategic decision-making process (Sugiharto *et al.*, 2013). An Islamic financing arrangement was proposed by Sugiharto and Lestari (2014) whereas a detail fair distribution of teak's revenue to all stakeholders by using mudharabah method was proposed by Sugiharto (2017).

METHODS

The object of this study was located in Gunung Kidul Regency, Yogyakarta Province, Indonesia, between 7^0 46' – 8^0 09' south latitude and 110^0 21' – 110^0 50' east longitude between year 2008 and 2019 in area of 10 hectares (Figure 2). This research have been carried between 2008 and 2019.

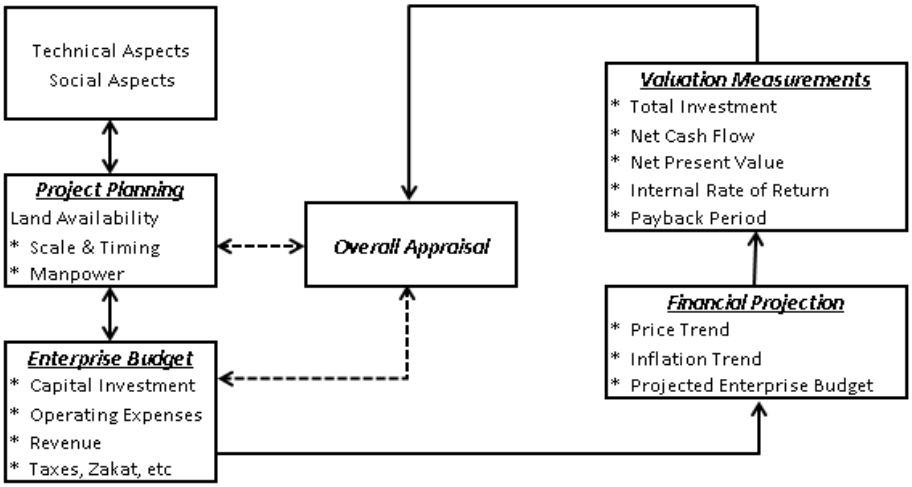

Figure 3.
Enterprise budget valuation framework

Note. Adapted from Gitinger (1982); Sugiharto et al. (2014).

This noncontrived field research was conducted in natural environment in which researcher's interference was limited to the selection of teak clones, trees' treatment, and harvesting schedule. The data being utilized were secondary data from the available publications as well as primary data. The primary data being collected was considered as longitudinal study by measuring teak's growth (diameter and height) over times. Systematic random sampling (measured in every five trees) and cluster sampling (based on the plant locations, time of plantations, and teak's clones) were applied (Sugiharto, 2013).

For the purpose of economic valuation of teak plantation, forecasted diameters and heights was modelled based on limited past primary field data and the secondary data from teak plantation in Costa Rica (Perez, 2005) and Indonesia (Pramono *et al.*, 2010).

An appraisal process was carried out by using the method of enterprise budget. Figure 3 demonstrates an enterprise budget valuation framework being adapted from Gitinger (1982) and Sugiharto *et al.* (2014).

Prior to the field activities, technical and social aspects was conducted. Project planning covered the availability of land, timing of plantation, and the availability of manpower.

Detail enterprise budget analysis was carried out to determine the capital investment, operating expenses, revenues, taxes, zakat, etc. For financial projection, costs and teakwood price increases were forecasted. Valuation criteria such as total investment, net cash flow, net present value, internal rate of return, and payback period were analized (Godsey, 2008; Salvatore, 2008).

Analytical tools

The data processing method is carried out by quantitative methods. The investment criteria being analyzed are, among others, Net Present Value (NVP) and Internal Rate of Return (IRR).

NPV is defined as the present value of expected future net cash flow, discounted at the cost of capital, minus the initial project cost (Nurmalina *et al.*, 2009):

$$NPV = \sum_{t=0}^{n} \frac{Bt-Ct}{(1+i)i}$$

Where:
NPV : Net Present Value
B_t : Benefit from t-year
C_t : Cost from t-year
i : Interest rate
t : year

IRR is the interest rate when NPV is equal to zero. IRR value greater than or equal to a predetermined discount rate refers that the business is feasible to run. Meanwhile, if the IRR is less than the predetermined discount rate, then the business is not worth the effort (Nurmalina *et al.*, 2009).

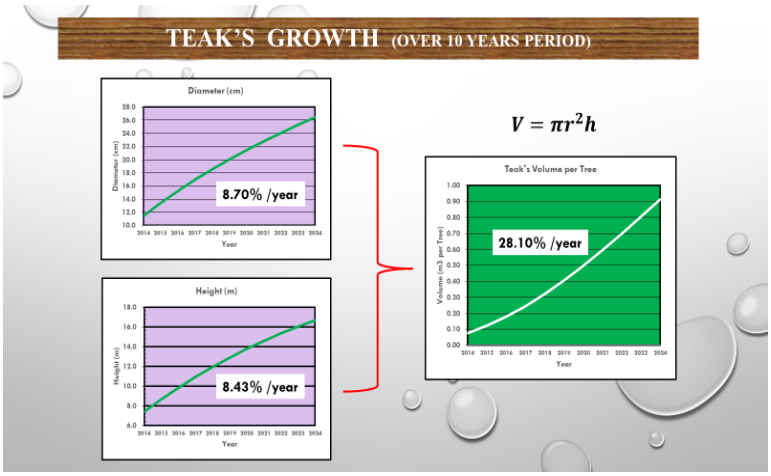

Figure 4.
Teak's growth

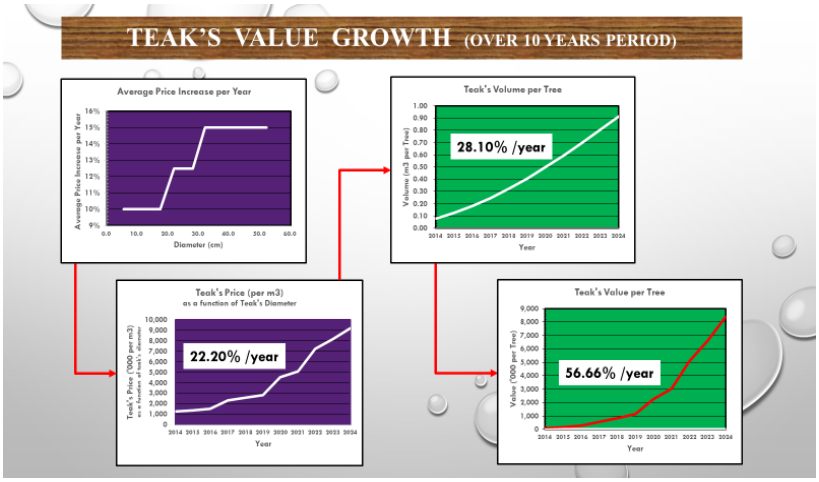

Figure 5.
Teak's price and value increases

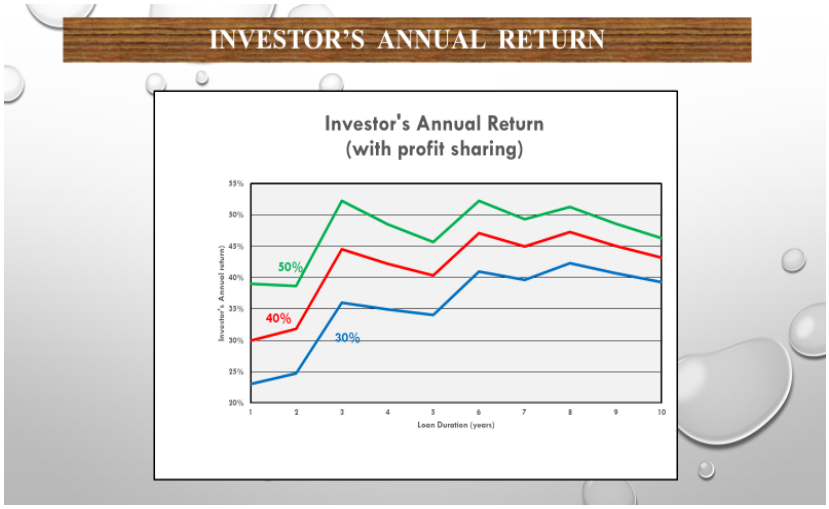

Figure 6.
Investor's annual return

$$IRR = i1 + \frac{NPV1}{NPV1 - NPV2} \times (i_1 - i_2)$$

Where:
IRR : Internal Rate of Return
i_1 : Interest rate that produce a positive NPV
i_2 : Interest rate that produce a negative NPV
NPV_1 : Positive NPV
NPV_2 : Negative NPV

RESULTS AND DISCUSSIONS

The teak diameter was measured at breast height and getting smaller away from the ground. To overcome the difficulty of measuring the diameter at the top of the sampled trees, several trees had been cut down and measured at different heights. The measurements indicated that the average diameter at the top of the trees was getting smaller to 0.7 and, therefore, for the purpose of volume calculation, a diameter adjustment of 0.7 had been employed. Figure 4 demonstrates the growth of teak in terms of diameter and height over a period of 10 years. Teak diameter grows around 8.70% per year whereas the average growth of height is 8.43% per year. These resulting the average volume growth of 28.10% per year.

Teak price per m3 increases per year is depending on the diameter of the teak wood.

In general, for the same amount of volume, the smaller the diameter, the cheaper the price of teak wood. It is most likely happened that by postponing the harvesting time, the value of teak wood increases not only due to the volume and price increases, but also due to moving the price range to the higher price range. Figure 5 demonstrates that in average, teak price increase per year as a combination of diameter growth and price increase is 22.20% per year. Multiplying with teak's volume increase per year, yielding teak's value increases per year of 56.66%.

The investor's annual return is depended on the percentage being received by investor after the investment is paid. Sugiharto (2017) suggested that the fair percentage being received by investor is the range between 23% and 70%. Figure 6 shows the investor's annual return as function of investor's share of profit and the harvesting delay. Three different investor's profit sharing of 30%, 40%, and 50% were analysed.

If the profit sharing for investor is 40% and the delay of harvesting is 5 years, the average annual return for investor is 40% per year. This is well above the conventional interest rate for loan.

CONCLUSIONS

The average annual return for investor is much higher compare to conventional interest rate on loan. In term of financial value, teak trees as biological assets should be considered as secure and safe loan collateral for investors or commercial financial institutions. For the smallholder farmers, postponing the harvesting time being supported by financial institutions by way of bridging loan will overcome their problem of being trapped by loan shark individuals.

Due to lack of regulation, it is proposed that government issue a regulation allowing financial institutions to provide mudharabah based loan, especially to smallholder farmers, by using biological assets as collateral.

REFERENCES

BLU Pusat P2H. (December 21, 2017). Kredit Tunda Tebang Bantu Petani Hutan Rakyat dan Penyelamatan Hutan. Retrieved from https://blup3h.id/kredit-tunda-tebang-bantu-petani-hutan-rakyat-dan-penyelamatan-hutan/.

Chemuliti, J., Ackello-Ogutu, C., Stephen, M., & Irungu, P. (2019). Financial Profitability of Carbon Offset Monoculture Plantation Forestry on Smallholder Farms in Trans Mara Sub-County, Kenya, *East African Agricultural and Forestry Journal,* 1-12.

Dusuki, A.W. (2010). Do Equity-Based *Sukuk* Structures in Islamic Capital Markets Manifest the Objectives of Shariah?, *Journal of Financial Services Marketing, 15,* 203-214.

Efansyah, M.N., Bintoro, M.H., Limbong, W.H. (2012). Prospek Usaha Bagi Hasil Penanaman Jati Unggul Nusantara (Studi Kasus Pada Koperasi Perumahan Wanabhakti Nusantara di Kabupaten Bogor), *Jurnal Manajemen Pengembangan Industri Kecil Menengah,* 7(1), 64-73.

Faculty of Forestry – Gadjah Mada University. (2009). *Wanagama Educational and Experimental Forest*. Fakultas Kehutanan Universitas Gadjah Mada, Yogyakarta, Indonesia.

Fitriani, I.L. (2017). Jaminan Dan Agunan Dalam Pembiayaan Bank Syariah Dan Kredit Bank Konvensional, *Jurnal Hukum & Pembangunan, 47*(1), 134-149.

Frey, G. E., Cubbage, F. W., Ha, T. T. T., Davis, R. R., Carle, J. B., Thon, V. X., & Dzung, N. V. (2018). Financial analysis and comparison of smallholder forest and state forest enterprise plantations in Central Vietnam, *International Forestry Review*, *20*(2), 181-198.

Gittinger, J.P. (1982). *Economic Analysis of Agricultural Projects*. The John Hopkins University Press. Baltimore, Maryland, USA.

Godsey, L.D. (2008). *Economic Budgeting for Agroforestry Practices.* University of Missouri Center for Agroforestry. USA.

Hallett, J.T., Díaz-Calvo, J., Villa-Castillo, J., Wagner, M.R. (2011). Teak Plantations: Financial Bonanza or Environmental Disaster? *Journal of Forestry*. 109(5): 288–292.

Kamayanti, A., Kurniawan R., Mulawarman, A.D.. (2014). Biological assets valuation reconstruction: A critical study of IAS 41 on agricultural accounting in Indonesian farmers. *Procedia-Social and Behavioral Sciences.* 164, 68-75.

Kibirige, D. (2014). A Comparison of Estimated Maize and Cabbage Enterprise Budgets of Ideal Small-Scale Commercial and

Subsistence Farms in the Eastern Cape Province of South Africa, *International Journal of Economics, Commerce and Management. United Kingdom, II*(12).

McConnell, T. E., Altizer, C. B., Pickens, B. (2016). The Pine Straw Industry of North Carolina: A Preliminary Contributions Analysis, *Forest Economics and Policy in a Changing Environment: How Market, Policy, and Climate Transformations Affect Forests*, 132.

Murtinah, V., Marjenah, A.R., Ruhiyat, D. (2015). Pertumbuhan Hutan Tanaman Jati *(Tectona grandis Linn. f.)* di Kalimantan Timur. *Agrifor, 14*(2), 287-292.

Nurmalina, R., Sarianti, T., Karyadi, A. (2009). Studi Kelayakan Bisnis. Butt Design & Printing, Bogor.

Perdana, A. (2011). Memahami Rantai Perdagangan Kayu Jati. *http://kiprahagroforestri.blogspot.com/2011/01/memahami-rantai-perdagangan-kayu-jati.html.*

Pérez, D. (2005). *Stand Growth Scenarios for Tectona Grandis Plantation in Costa Rica*. PhD Dissertation. University of Helsinki. Helsinki, Finland.

Pramono, A.A., Fauzi, M.A., Widyani, N., Heriansyah, I., Roshetko, J.M. (2010). *Pengelolaan Hutan Jati Rakyat: Panduan Lapangan untuk Petani*. Center for International Forestry Research. Bogor, Indonesia.

Purnomo, H., Achdiawan, R., Shantiko, B., Amin, S. M., Irawati, R. H., & Wardell, D. A. (2016). Multi-stakeholder processes to strengthen policies for small and medium-scale forestry enterprises in Indonesia, *International Forestry Review*, *18*(4), 485-501.

Salvatore, D. (2008). *Managerial Financials: Principles and Worldwide Applications.* Sixth Edition. Oxford University Press.

Sugiharto. (2013). *Business Development Model of Integrated Agribusiness in Dryland Areas of Yogyakarta*. Doctoral Dissertation. Bogor Agricultural University.

Sugiharto, S. (2017). Greenpreneurship at the Base of the Pyramid: A Small Scale Community-Based Afforstation Project in Indonesia, *AGROFOR International Journal, 2*(3). 20-26.

Sugiharto, S., Gumbira-Sa'id, E., Daryanto, H.K., Suroso, A.I. (2012). *Harvesting Strategy of Teak (Tectona grandis L.f) Plantation and Its Impact on the Financial Valuation*. ELLTA 2012. Langkawi. December 2012.

Sugiharto, S., Gumbira-Sa'id, E., Daryanto, H.K., Suroso, A.I. (2013). Small-Scale Community-Based Dryland Agroforestry in Yogyakarta, Indonesia, *Social Science Letter Journal, 1* (1): 20-29.

Sugiharto, S., Gumbira-Sa'id, E., Daryanto, H.K., Suroso, A.I. (2014). Annual Equivalent Value, Benefit Cost Ratio, and Composite Performance Index as Valuation Appraisal Support of Teakwood Plantation, *Jurnal Manajemen Hutan Tropik,* XX(1): 58-65.

Sugiharto, S., Lestari, S.D. (2014). The Role of Sukuk Financing for Sustainable Development of Smallholder Farmers, *Australasian Accounting, Business and Finance Journal, 8*(5), 79-92.

Widyaningsih, T. S., Achmad, B. (2012). Analisis finansial usaha tani hutan rakyat pola wanafarma di Majenang, Jawa Tengah, *Jurnal Penelitian Hutan Tanaman*, *9*(2), 105-120.