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an important matter to the whole cashflow calculation, ignoring the burden of small amounts of costs, and the labor costs are not counted specifically between farmer's family. The whole cultivation business is run conventionally without detailed calculations even though the cultivation has potential advantages in terms of quality and share market. The calculation of the feasibility of farming has been carried out in many regions and countries (Bwala et al., 2018; Haider et al., 2018; Bajracharya et al., 2016; Nuswardhani, 2017; Paridah et al., 2017). The unique characteristics between different regions leads to the difference of how the technology, land, and human resources is used and processed. Therefore, the results of the business feasibility analysis in each region would be different as well. In this case, a research was conducted to analyze the feasibility of business in rice, kenaf, and corn farmer groups in West Laren. This business feasibility analysis can inform us which farmer group activities are the most economically feasible. The difference of this research with the previous one is the utilization of Net Present Value (NPV), Internal Rate of Return (IRR), and Profitability index (IP) between three commodities, which is rice, corn, and kenaf as the tools to analyze business feasibility. We can obtain the information about which commodity cultivation is feasible and profitable from the NPV, IRR, and IP values. The calculation system uses a simple Microsoft Excel spreadsheet formula to optimize financial models. This research is expected to be a reference for farmers to maximize cultivation activities that are feasible to produce higher income. Besides that, it also can be a reference in developing Bonorowo land as a potential land with great agricultural sector potential in Laren Subdistrict. RESEARCH METHOD A. Study of Literature Research on the feasibility of agricultural business in several countries has been widely carried out. In rice cultivation, they analyzed the costs and profitability of small-scale rice farming in Nigeria (Ohen & Ajah, 2015), conducted an analysis of income from rice cultivation in two different regions in Nigeria (Nwalieji, 2016), calculated the Benefit Cost ratio in rice cultivation in Bangladesh (Sujan et al., 201), conducted research on calculating profitability and productivity from rice cultivation for three categories of farmers (small, medium and large farmers) on the coast of Bangladesh (Islam et al., 2017), and made a comparison of rice financing and income with brick production businesses in South Sulawesi (Saediman et al., 2019). While in corn cultivation, some researchers compared the profitability and productivity of corn sales using organic farming systems with conventional systems in Kenya (Adamtey et al., 2016), conducted research on the selection of hybrid corn from several different varieties in Nepal, economically and statistically (Ghimire et al., 2016), analyzed the sale of corn yielded with organic fertilizer and inorganic fertilizer (Sekumade, 2017), and made a comparison feasibility of corn and tomato business in Nigeria (Ammani, 2015). Feasibility analysis of rice and corn cultivation business by has also been done in Indonesia (Silitonga et al., 2016; Nuryanti & Niken, 2017) by taking cost and revenue into consideration. However, so far, a feasibility analysis of the kenaf cultivation has only been carried out by two researchers. They calculated the Benefit Cost ratio for kenaf agriculture in Malaysia when the kenaf yield was 10 tons/hectare, 12 tons/hectare, and 15 tons/hectare (Abdelrhman et al., 2016; Paridah et al., 2017). B. Data Collection The research was carried out in the West Laren sub-district farmer groups covering Pelangwot, Bulutigo, Siser, Mojo Adem, Pesanggrahan, Keduyung, Centini, Durikulon, Jabung, Dateng, and Gelap villages. The choice of location is based on the consideration that the location is Bonorowo land and the largest kenaf planting area in Indonesia (Irawati & Wulandari, 2019). The data collected in this study is secondary data in the form of records and documentation of all costs of rice, corn and kenaf cultivation activities carried out in 2017/2018, 2018/2019 and 2019/2020. Cost data includes all costs of

the rice, corn and kenaf cultivation process with a land boundary per 0.1 hectare. The data consists of the amount of harvest, the selling price, the cost of purchasing fertilizers, pesticides, water, rat poison, raffia, plastic dividers, purchasing seeds, land rent, tractor rental, depreciation of equipment, wages for workers in the family, and wages for workers outside family. The overall costs for the cultivation of rice, corn, and kenaf are presented in Table 1, Table 2 and Table 3. All of these data were obtained from the head of the farmer group in the Bonorowo land, Laren. Table 1. Rice cultivation costs per 0.1 hectares 2017/2018 2018/2019 Urea fertilizer (Rp.) 60,000 60,000 TSP fertilizer (Rp.) 40,000 40,000 Pesticide (Rp.) 80,000 90,000 Rat poison (Rp.) 130,000 150,000 String of raffia (Rp.) 30,000 70,000 Border Plastic (Rp.) 315,000 320,000 Outside the family workforce (Rp.) 915,000 1,250,000 Water (Rp.) 320,000 340,000 Seeds (Rp.) 240,000 240,000 Labor in the family (Rp.) 635,000 790,000 Land lease (Rp.) 0 0 Rent a tractor (Rp.) 190,000 190,000 Depreciation (Rp.) 91,950 91,950 Total Cost (Rp.) 3,046,950 3,631,950 2019/2020 60,000 40,000 90,000 150,000 75,000 335,000 1,300,000 350,000 250,000 850,000 200,000 210,000 91,950 4,001,950 Table 2. Corn cultivation costs per 0.1 hectare 2017/2018 2018/2019 Urea fertilizer (Rp.) 100,000 100,000 Pesticide (Rp.) 30,000 40,000 Outside the family workforce (Rp.) 810,000 1,025,000 Water (Rp.) 60,000 80,000 Seeds (Rp.) 200,000 250,000 Labor in the family (Rp.) 770,000 950,000 Land lease (Rp.) 0 0 Depreciation (Rp.) 91,950 91,950 Total Cost (Rp.) 2,061,950 2,536,950 2019/2020 100,000 40,000 1,025,000 80,000 250,000 950,000 200,000 91,950 2,736,950 Table 3. Kenaf fiber cultivation costs per 0.1 hectare 2017/2018 2018/2019 Urea fertilizer (Rp.) 100,000 100,000 Pesticide (Rp.) 40,000 40,000 Outside the family workforce (Rp.) 400,000 650,000 Seeds (Rp.) 30,000 36,000 Labor in the family (Rp.) 440,000 600,000 Land lease (Rp.) 0 0 Depreciation (Rp.) 91,950 91,950 Total Cost (Rp.) 1,101,950 1,517,950 2019/2020 100,000 40,000 650,000 36,000 600,000 200,000 91,950 1,717,950 C. Data Processing The research data needed includes the calculation of costs, revenues, and profit. The costs includes labor costs, the overall cost of materials and tools during cultivation. The revenue is the gross income obtained when the unit product from yield is multiplied by the market price. The data processed is data for 3 years, which is 2017/2018, 2018/2019, and 2019/2020. The profit is the difference between total revenue and total cost. The cost of the tools is calculated from the cost of the depreciation of the tools. Depreciation of the tools is calculated using the straight- line method, which shrink linearly during its life. Depreciation of the equipment calculated in this study is the depreciation of the use of hoes, buckets, gloves, masks, sickles, and pesticide sprayer tools. Depreciation formula is: Depreciation = (Price- Residual value)/(Economic age) (1) This study uses the calculation of Net Present Value (NPV), Internal Rate of Return (IRR), and Profitability Index (PI). NPV is the difference between the present value of an investment and the present value of future net cash receipts (Lukman, 2019). A business is feasible if the NPV value is greater than 0 or positive. Otherwise, if the NPV value is less than 0 or negative, then the business is considered not feasible. A business that has an NPV value of less than 0 or negative means that all revenue received has not been able to cover all costs incurred. NPV > 0, then a business is considered feasible. NPV ≤ 0, then a business is considered not feasible (Susinto, 2017). NPV calculation in Microsoft Excel can be seen in equation 2. = (NPV(Reinvestment rate;Net cashflow1:Net cashflown))+Net cashflow0 (2) IRR is a method of valuing investments with a maximum interest rate to arrive at an NPV value of 0 (Yarni et al., 2017). IRR of a business is feasible if the IRR value is greater than the desired level of profit. Conversely, if the IRR is smaller than the desired level of profit then the business is considered not feasible to run (Ediwodjojo et al., 2018). IRR calculation in Microsoft Excel

can be seen in equation 3. =IRR(Net cashflow1:Net cashflown) (3) PI or Profitability Index is a method of calculating business feasibility by comparing the present value of cash flow values with the investment value of a business. A business is considered feasible if the PI value > 1 (Lukman, 2019). The calculation of PI in Microsoft Excel can be seen in equation 4. = (NPV(Reinvestment rate; Net cashflow1:Net cashflown))/ Net cashflow0 (4) RESULTS AND DISCUSSION Land with seasonal flooding makes Laren Subdistricts holds great potential in agriculture. In this study, a financial and feasibility analysis of rice, corn and kenaf cultivation was carried out for 3 years. Some assumptions used in this study are the capital used is farmers' own capital, the discounted factor is 12% per year, revenue is obtained only from farmers' harvests, and year 0 is labelled as the initial year when the investments are purchased. A. Cashflow Calculation Cashflow calculation is obtained from income after deducting taxes and depreciation or depreciation of fixed assets. Data needed in the calculation of cashflow are the total costs and the total income received by farmers during one period. The calculation for 3 years per 0.1 hectare is shown in table 4, table 5, table 6, and table 7. Table 4. Calculation of total revenue from rice, corn, and kenaf cultivation for 3 years per 0.1 hectare Yields (kg) Selling price (Rp.) Total income (Rp.) 2017/2018 2018/2019 2019/2020 Rice Corn Kenaf fiber Rice Corn Kenaf fiber Rice Corn Kenaf fiber 515 740 300 800 700 300 800 700 300 4,225 3,250 6,500 5,150 4,250 6,700 5,300 4,200 7,000 2,175,875 2,405,000 1,950,000 4,120,000 2,975,000 2,010,000 4,240,000 2,940,000 2,100,000 Table 5. Calculation of cashflow for rice cultivation for 3 years per 0.1 hectare 2017/2018 2018/2019 2019/2020 Total income (Rp.) 2,175,875 4,120,000 4,240,000 Total cost (Rp.) 3,046,950 3,631,950 4,001,950 Net cashflow (Rp.) -871,075 488,050 238,050 Table 6. Calculation of cashflow for corn cultivation for 3 years per 0.1 hectare 2017/2018 2018/2019 2019/2020 Total income (Rp.) 2,405,000 2,975,000 2,940,000 Total cost (Rp.) 2,061,950 2,536,950 2,736,950 Net cashflow (Rp.) 343,050 438,050 203,050 Table 7. Calculation of cashflow for kenaf fiber cultivation for 3 years per 0.1 hectare 2017/2018 2018/2019 2019/2020 Total income (Rp.) 1,950,000 2,010,000 2,100,000 Total cost (Rp.) 1,101,950 1,517,950 1,717,950 Net cashflow (Rp.) 848,050 492,050 382,050 Based on the cashflow calculation in table 5, table 6, and table 7, it can be seen that the net profit from rice cultivation for 3 years per 0.1 hectare is Rp. -871,075, Rp. 488,050 and Rp. 238,050. Every year the net profit obtained by farmers is not always the same because of different natural conditions each year. Even in 2017/2018 farmers suffered losses due to decreased rice yields compared to 2018/2019 and 2019/2020. Net profit from corn cultivation for 3 years per 0.1 hectare is Rp. 343,050, Rp. 438,050, and Rp. 203,050. Net income from kenaf cultivation for 3 years per 0.1 hectare is Rp. 848,050, Rp. 492,050, and Rp. 382,050. B. Calculation of NPV, IRR, and IP All NPV, IRR, and IP calculations use Ms. Excel. This should simplify and increase the accuracy of the calculations. NPV and IRR for the 3 cultivation business can be seen in figure 1. Figure 1. Calculation of NPV and IRR with Ms. Excel Based on the results of the NPV calculation in figure 1, it can be seen that for all 3 years the NPV value of the rice cultivation business has negative value of Rp. -495,085.78, so rice cultivation business is not feasible to be continued. Meanwhile, the NPV value of corn cultivation business is Rp. 524,182.40. and the NPV value of kenaf cultivation business is Rp. 1,145,532.39. This results show that corn and kenaf cultivation business is feasible to be continued. Calculation from figure 1 also show that the IRR value for rice cultivation is -25.18%. Based on previous research, the cultivation should be continued if the IRR value is greater than the value of discounted factor (Wismaningrum et al., 2013). In this research, the discounted factor is 12%, so the rice cultivation business in Bonorowo land is not feasible to be continued. The IRR value of corn cultivation is 144.43%

and the IRR value of kenaf cultivation is 266.43%. The IRR value of corn and kenaf cultivation is above 12% so that the cultivation of corn and kenaf is feasible to be continued. IP calculations using Ms. Excel. Based on that, the IP value of rice, corn and kenaf cultivation is consecutively -0.79; 2,9; and 5.15. Hence, we can conclude that the rice cultivation business is not feasible to be continued because the IP value is smaller than 1. While the corn and kenaf cultivation businesses is feasible to be continued because the IP value is more than 1. From all the economic analysis that has been done, the cultivation business that is feasible and profitable for farmers in are corn and kenaf cultivation. And the cultivation business that is not feasible to be continued and cause losses is rice cultivation. The rice cultivation business causes losses because the process of rice cultivation is more complicated so it requires more workers and materials. The most profitable cultivation business is kenaf cultivation. It has an easy process to do, does not require special treatment, utilize simple supporting materials, and the plants itself are not easily attacked by pests. Therefore, the overall costs for kenaf cultivation is much lower for farmers. Besides that, the selling price of kenaf fiber is higher than the selling price of rice and corn. CONCLUSIONS The results of an economic analysis of the cultivation of rice, corn and kenaf in Bonorowo land, Laren Subdistrict, are that corn and kenaf cultivation is feasible and profitable for farmers. On the contrary, rice cultivation is not feasible and results in losses for farmers. The NPV, IRR, and PI values of the corn cultivation business are Rp. 524,182.40; 144.43%; and 2.9, while the NPV, IRR, and PI values from the kenaf cultivation business are Rp. 1,145,532,39; 266.43%; and 5.15. Rice cultivation business leads to negative NPV, IRR, and PI values, which are Rp. -495,085.78; -25.18%; and -0.79. The selling price of kenaf fiber is higher than the selling price of rice and corn. Economically, farmers can still use Bonorowo land which has been considered unprofitable, by planting corn in the dry season and kenaf in the rainy season. REFERENCES Abdelrhman, H.A., Shahwahid, M., Paridah, M.T., Ara, S., Maaei, H., Ogeri, A. (2016). Financial and technical assessment of kenaf cultivation for producing fiber utilized in automotive components. Business and Economics Journal, 7(4), 1-8. Adamtey, N., Musyoka, M.W., Zundel, C., Cobo, J.G. (2016). Productivity, profitability, and partial nutrient balance in maize-based conventional and organic farming systems in Kenya. Agriculture, Ecosystems, & Environment, 235, 61-79. Ammani, A.A. (2015). Costs and returns analysis for small-scale irrigated crop production in Kaduna State, Nigeria. Scientia Agriculturae, 10(2), 64-69. Bajracharya, M., Sapkota, M., Dhungana, S.M. (2016). Socio-economic analysis of maize seed production in Arghakhanchi District of Nepal. Journal of Maize Research and Development, 2(1), 144–150. Bwala, M.A., Aniobi, U.J. (2018). Profitability analysis of paddy production: a case of agricultural zone 1, Niger State Nigeria. Journal Bangladesh Agricultural University, 16(1), 88-92. Chaiyaput, S., Bergado, D.T., Artidteang, S. (2014). Measured and simulated results of a kenaf Limited Life Geosynthetics (LLGS) reinforced test embankment on soft clay. Geotextiles and Geomembranes, 42(1), 39–47. Ding, Z., Shi, S.Q., Zhang, H., Cai, L. (2015). Electromagnetic shielding properties of iron oxide impregnated kenaf bast fiberboard. Composites Part B: Engineering, 78, 266–271. Ediwodjojo, S.P., Ginting, I.R. (2018). Analisis investasi dengan perhitungan NPV, IRR dan payback period pada produksiikan presto gita pindang Desa Kalitengah Kecamatan Gombong. Jurnal E-Bis, 2(1), 7-15. Hassan, F., Rozli, Z., Mariyam, J.G., Che, H.A. (2017). Kenaf fiber composite in automotive industry: an overview, international journal on advanced science. Engineering and Information Technology, 7(1), 315-321. Haider, M.Z., Akter, R. (2018). Shrimp-paddy conflict in the South-West Coastal Region of Bangladesh. Internasional Journal of Agricultural Economics, 3(1), 9-13. Irawati, D.Y., Wulandari, L.M.C. (2019). Life cycle assessment analysis of kenaf cultivation in bonorowo land,

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by Albertus Daru Dewantoro

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SPREADSHEET BASED BUSINESS DECISION MAKING SYSTEM (CASE STUDY IN BONOROWO LAND, LAREN, LAMONGAN)

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ABSTRACT

Bonorowo land in Laren Subdistricts, Lamongan Districts, is one of the areas that uses its land for rice, corn and kenaf cultivation. The agricultural sector in Laren does not yet have a detailed economic analysis. Farmers ignore the importance of considering initial capital and some "small" costs in this activities. Therefore, in this study, the calculation of business feasibility was carried out on rice, kenaf, and corn farmer groups in Bonorowo land, West Laren. Business feasibility analysis is conducted through calculation of the value of NPV, IRR, and IP. The calculation system uses a Microsoft Excel spreadsheet formula. The NPV, IRR, and PI values of corn cultivation are Rp. 524,182.40; 144.43%; and 2,9. The NPV, IRR, and PI values for kenaf cultivation are Rp. 1,145,532.39; 266.43%; and 5.15. The NPV, IRR, and PI values for rice cultivation are Rp. -495,085.78; -25.18%; and -0.79. The results of the economic analysis of the cultivation of rice, corn, and kenaf in Bonorowo land, Laren Subdistrict, show that rice cultivation has caused losses and is not feasible to continue.

INTRODUCTION

The agricultural sector is the livelihood and the main sector of the Indonesian population. Based on the results of the 2018 Inter-Census Agriculture Survey, the number of households relies on agricultural business in Indonesia is 27,682,117 people. According to the SUTAS2018 Team (2018), the top five of agricultural sub-sectors are rice farming (13,155,108 people), plantations (12,074,520 people), horticulture (10,104,683 people), crops (7,129,401 people), and forestry plants (5,408,409 people). The agricultural sub-sector becomes a provider of jobs, the fulfillment of food diversity, an export's support for both the industrial sector and agricultural products, a contributor to national foreign exchange, and it reduces of the number of poor people in rural areas. Laren Subdistrict, Lamongan Regency is one of the area that utilizes its land for several agricultural subsectors. The type of land in Laren Subdistrict is seasonal

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flood land, or often called Bonorowo land. Bonorowo is a Javanese term consisting of the words "beno" and "rowo" which means flood and swamp (Soegiyanto et al., 2015).

The rice cultivation in Bonorowo Laren land is carried out in the transition season from rain to dry season, which is from April to August. Coincidentally, the corn cultivation is also carried out in the same period as rice. To maximize cultivation on the Bonorowo Laren land, kenaf is planted from September to March, according to the inundated conditions of Bonorowo land and swamps during that period. The part of the kenaf plant that is used is the fiber from the stem. Kenaf fiber is used as the material for making cement wall panels (Saba et al., 2015; Zhou et al., 2018), automotive structural components (Hassan et al., 2017; Verma & Sharma, 2017), fiber drain (Nguyen & Indraratna, 2017), geo textiles (Chaiyaput et al., 2014; Shirazi et al., 2019), and fiber board (Ding et al., 2015). The agricultural sector in Laren does not yet have a detailed economic analysis. The farmers always do not consider the initial capital as an important matter to the whole cashflow calculation, ignoring the burden of small amounts of costs, and the labor costs are not counted specifically between farmer's family. The whole cultivation business is run conventionally without detailed calculations even though the cultivation has potential advantages in terms of quality and share market.

The calculation of the feasibility of farming has been carried out in many regions and countries (Bwala et al., 2018; Haider et al., 2018; Bajracharya et al., 2016; Nuswardhani, 2017; Paridah et al., 2017). The unique characteristics between different regions leads to the difference of how the technology, land, and human resources is used and processed. Therefore, the results of the business feasibility analysis in each region would be different as well. In this case, a research was conducted to analyze the feasibility of business in rice, kenaf, and corn farmer groups in West Laren. This business feasibility analysis can inform us which farmer group activities are the most economically feasible. The difference of this research with the previous one is the utilization of Net Present Value (NPV), Internal Rate of Return (IRR), and Profitability index (IP) between three commodities, which is rice, corn, and kenaf as the tools to analyze business feasibility. We can obtain the information about which commodity cultivation is feasible and profitable from the NPV, IRR, and IP values. The calculation system uses a simple Microsoft Excel spreadsheet formula to optimize financial models. This research is expected to be a reference for farmers to maximize cultivation activities that are feasible to produce higher income. Besides that, it also can be a reference in developing Bonorowo land as a potential land with great agricultural sector potential in Laren Subdistrict.

RESEARCH METHOD

A. Study of Literature

Research on the feasibility of agricultural business in several countries has been widely carried out. In rice cultivation, they analyzed the costs and profitability of small-scale rice farming in Nigeria (Ohen & Ajah, 2015), conducted an analysis of income from rice cultivation in two different regions in Nigeria (Nwalieji, 2016), calculated the Benefit Cost ratio in rice cultivation in Bangladesh (Sujan et al., 201), conducted research on calculating profitability and productivity from rice cultivation for three categories of farmers (small, medium and large farmers) on the coast of Bangladesh (Islam et al., 2017), and made a comparison of rice financing and income with brick production businesses in South Sulawesi (Saediman et al., 2019). While in corn cultivation, some researchers compared the profitability and productivity of corn sales using organic farming systems with conventional systems in Kenya (Adamtey et al., 2016), conducted research on the selection of hybrid corn from several different varieties in Nepal, economically and statistically (Ghimire et al., 2016), analyzed the sale of corn yielded with organic fertilizer and inorganic fertilizer (Sekumade, 2017), and made a comparison feasibility of corn and tomato business in Nigeria (Ammani, 2015). Feasibility analysis of rice and corn cultivation business by has also been done in Indonesia (Silitonga et al., 2016; Nuryanti & Niken, 2017) by taking cost and revenue into consideration. However, so far, a feasibility analysis of the kenaf cultivation has only been carried out by two researchers. They calculated the Benefit Cost ratio for kenaf agriculture in Malaysia when the kenaf yield was 10

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tons/hectare, 12 tons/hectare, and 15 tons/hectare (Abdelrhman et al., 2016; Paridah et al., 2017).

B. Data Collection

The research was carried out in the West Laren sub-district farmer groups covering Pelangwot, Bulutigo, Siser, Mojo Adem, Pesanggrahan, Keduyung, Centini, Durikulon, Jabung, Dateng, and Gelap villages. The choice of location is based on the consideration that the location is Bonorowo land and the largest kenaf planting area in Indonesia (Irawati & Wulandari, 2019). The data collected in this study is secondary data in the form of records and documentation of all costs of rice, corn and kenaf cultivation activities carried out in 2017/2018, 2018/2019 and 2019/2020. Cost data includes all costs of the rice, corn and kenaf cultivation process with a land boundary per 0.1 hectare. The data consists of the amount of harvest, the selling price, the cost of purchasing fertilizers, pesticides, water, rat poison, raffia, plastic dividers, purchasing seeds, land rent, tractor rental, depreciation of equipment, wages for workers in the family, and wages for workers outside family. The overall costs for the cultivation of rice, corn, and kenaf are presented in Table 1, Table 2 and Table 3. All of these data were obtained from the head of the farmer group in the Bonorowo land, Laren.

Table 1. Rice cultivation costs per 0.1 hectares

	2017/2018	2018/2019	2019/2020
Urea fertilizer (Rp.)	60,000	60,000	60,000
TSP fertilizer (Rp.)	40,000	40,000	40,000
Pesticide (Rp.)	80,000	90,000	90,000
Rat poison (Rp.)	130,000	150,000	150,000
String of raffia (Rp.)	30,000	70,000	75,000
Border Plastic (Rp.)	315,000	320,000	335,000
Outside the family workforce (Rp.)	915,000	1,250,000	1,300,000
Water (Rp.)	320,000	340,000	350,000
Seeds (Rp.)	240,000	240,000	250,000
Labor in the family (Rp.)	635,000	790,000	850,000
Land lease (Rp.)	0	0	200,000
Rent a tractor (Rp.)	190,000	190,000	210,000
Depreciation (Rp.)	91,950	91,950	91,950
Total Cost (Rp.)	3,046,950	3,631,950	4,001,950

Table 2. Corn cultivation costs per 0.1 hectare

	2017/2018	2018/2019	2019/2020
Urea fertilizer (Rp.)	100,000	100,000	100,000
Pesticide (Rp.)	30,000	40,000	40,000
Outside the family workforce (Rp.)	810,000	1,025,000	1,025,000
Water (Rp.)	60,000	80,000	80,000
Seeds (Rp.)	200,000	250,000	250,000
Labor in the family (Rp.)	770,000	950,000	950,000
Land lease (Rp.)	0	0	200,000
Depreciation (Rp.)	91,950	91,950	91,950
Total Cost (Rp.)	2,061,950	2,536,950	2,736,950

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Table 3. Kenaf fiber cultivation costs per 0.1 hectare

	2017/2018	2018/2019	2019/2020
Urea fertilizer (Rp.)	100,000	100,000	100,000
Pesticide (Rp.)	40,000	40,000	40,000
Outside the family workforce (Rp.)	400,000	650,000	650,000
Seeds (Rp.)	30,000	36,000	36,000
Labor in the family (Rp.)	440,000	600,000	600,000
Land lease (Rp.)	0	0	200,000
Depreciation (Rp.)	91,950	91,950	91,950
Total Cost (Rp.)	1,101,950	1,517,950	1,717,950

C. Data Processing

The research data needed includes the calculation of costs, revenues, and profit. The costs includes labor costs, the overall cost of materials and tools during cultivation. The revenue is the gross income obtained when the unit product from yield is multiplied by the market price. The data processed is data for 3 years, which is 2017/2018, 2018/2019, and 2019/2020. The profit is the difference between total revenue and total cost. The cost of the tools is calculated from the cost of the depreciation of the tools. Depreciation of the tools is calculated using the straight-line method, which shrink linearly during its life. Depreciation of the equipment calculated in this study is the depreciation of the use of hoes, buckets, gloves, masks, sickles, and pesticide sprayer tools. Depreciation formula is:

$$\text{Depreciation} = (\text{Price} - \text{Residual value})/(\text{Economic age}) \quad (1)$$

This study uses the calculation of Net Present Value (NPV), Internal Rate of Return (IRR), and Profitability Index (PI). NPV is the difference between the present value of an investment and the present value of future net cash receipts (Lukman, 2019). A business is feasible if the NPV value is greater than 0 or positive. Otherwise, if the NPV value is less than 0 or negative, then the business is considered not feasible. A business that has an NPV value of less than 0 or negative means that all revenue received has not been able to cover all costs incurred. NPV > 0, then a business is considered feasible. NPV ≤ 0, then a business is considered not feasible (Susinto, 2017). NPV calculation in Microsoft Excel can be seen in equation 2.

$$=(\text{NPV}(\text{Reinvestment rate};\text{Net cashflow}_1:\text{Net cashflow}_n))+\text{Net cashflow}_0 \quad (2)$$

IRR is a method of valuing investments with maximum interest rate to arrive at an NPV value of 0 (Yarni et al., 2017). IRR of a business is feasible if the IRR value is greater than the desired level of profit. Conversely, if the IRR is smaller than the desired level of profit then the business is considered not feasible to run (Ediwodjojo et al., 2018). IRR calculation in Microsoft Excel can be seen in equation 3.

$$=\text{IRR}(\text{Net cashflow}_1:\text{Net cashflow}_n) \quad (3)$$

PI or Profitability Index is a method of calculating business feasibility by comparing the present value of cash flow values with the investment value of a business. A business is considered feasible if the PI value > 1 (Lukman, 2019). The calculation of PI in Microsoft Excel can be seen in equation 4.

$$=(\text{NPV}(\text{Reinvestment rate; Net cashflow}_1:\text{Net cashflow}_n))/\text{ Net cashflow}_0 \quad (4)$$

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RESULTS AND DISCUSSION

Land with seasonal flooding makes Laren Subdistricts holds great potential in agriculture. In this study, a financial and feasibility analysis of rice, corn and kenaf cultivation was carried out for 3 years. Some assumptions used in this study are the capital used is farmers' own capital, the discounted factor is 12% per year, revenue is obtained only from farmers' harvests, and year 0 is labelled as the initial year when the investments are purchased.

A. Cashflow Calculation

Cashflow calculation is obtained from income after deducting taxes and depreciation or depreciation of fixed assets. Data needed in the calculation of cashflow are the total costs and the total income received by farmers during one period. The calculation for 3 years per 0.1 hectare is shown in table 4, table 5, table 6, and table 7.

Table 4. Calculation of total revenue from rice, corn, and kenaf cultivation for 3 years per 0.1 hectare

		Yields (kg)	Selling price (Rp.)	Total income (Rp.)
2017/2018	Rice	515	4,225	2,175,875
	Corn	740	3,250	2,405,000
	Kenaf fiber	300	6,500	1,950,000
2018/2019	Rice	800	5,150	4,120,000
	Corn	700	4,250	2,975,000
	Kenaf fiber	300	6,700	2,010,000
2019/2020	Rice	800	5,300	4,240,000
	Corn	700	4,200	2,940,000
	Kenaf fiber	300	7,000	2,100,000

Table 5. Calculation of cashflow for rice cultivation for 3 years per 0.1 hectare

	2017/2018	2018/2019	2019/2020
Total income (Rp.)	2,175,875	4,120,000	4,240,000
Total cost (Rp.)	3,046,950	3,631,950	4,001,950
Net cashflow (Rp.)	-871,075	488,050	238,050

Table 6. Calculation of cashflow for corn cultivation for 3 years per 0.1 hectare

	2017/2018	2018/2019	2019/2020
Total income (Rp.)	2,405,000	2,975,000	2,940,000
Total cost (Rp.)	2,061,950	2,536,950	2,736,950
Net cashflow (Rp.)	343,050	438,050	203,050

Table 7. Calculation of cashflow for kenaf fiber cultivation for 3 years per 0.1 hectare

	2017/2018	2018/2019	2019/2020
Total income (Rp.)	1,950,000	2,010,000	2,100,000
Total cost (Rp.)	1,101,950	1,517,950	1,717,950
Net cashflow (Rp.)	848,050	492,050	382,050

Based on the cashflow calculation in table 5, table 6, and table 7, it can be seen that the net profit from rice cultivation for 3 years per 0.1 hectare is Rp. -871,075, Rp. 488,050 and Rp. 238,050. Every year the net profit obtained by farmers is not always the same because of different natural conditions each year. Even in 2017/2018 farmers suffered losses due to decreased rice yields compared to 2018/2019 and 2019/2020. Net profit from corn cultivation

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for 3 years per 0.1 hectare is Rp. 343,050, Rp. 438,050, and Rp. 203,050. Net income from kenaf cultivation for 3 years per 0.1 hectare is Rp. 848,050, Rp. 492,050, and Rp. 382,050.

B. Calculation of NPV, IRR, and IP

All NPV, IRR, and IP calculations use Ms. Excel. This should simplify and increase the accuracy of the calculations. NPV and IRR for the 3 cultivation business can be seen in figure 1.

NPV and IRR

Project Padi

	0	1	2	3
Cash flow:	-275.850	-871.075	488.050	238.050
NPV_S	-495085,78			
IRR_S	-25,18%			

Project Jagung

	0	1	2	3
Cash flow:	-275.850	343.050	438.050	203.050
NPV_S	524.182,40			
IRR_S	114,43%			

Project Kenaf

	0	1	2	3
Cash flow:	-275.850	848.050	492.050	382.050
NPV_S	1.145.532,39			
IRR_S	266,43%			

Figure 1. Calculation of NPV and IRR with Ms. Excel

Based on the results of the NPV calculation in figure 1, it can be seen that for all 3 years the NPV value of the rice cultivation business has negative value of Rp. -495,085.78. So rice cultivation business is not feasible to be continued. Meanwhile, the NPV value of corn cultivation business is Rp. 524,182.40. and the NPV value of kenaf cultivation business is Rp. 1,145,532.39. This results show that corn and kenaf cultivation business is feasible to be continued.

Calculation from figure 1 also show that the IRR value for rice cultivation is -25.18%. Based on previous research, the cultivation should be continued if the IRR value is greater than the value of discounted factor (Wismaningrum et al., 2013). In this research, the discounted factor is 12%, so the rice cultivation business in Bonorowo land is not feasible to be continued. The IRR value of corn cultivation is 144.43% and the IRR value of kenaf cultivation is 266.43%. The IRR value of corn and kenaf cultivation is above 12% so that the cultivation of corn and kenaf is feasible to be continued.

IP calculations using Ms. Excel. Based on that, the IP value of rice, corn and kenaf cultivation is consecutively -0.79; 2,9; and 5.15. Hence, we can conclude that the rice cultivation business is not feasible to be continued because the IP value is smaller than 1. While the corn and kenaf cultivation businesses is feasible to be continued because the IP value is more than 1.

From all the economic analysis that has been done, the cultivation business that is feasible and profitable for farmers in are corn and kenaf cultivation. And the cultivation business that is not feasible to be continued and cause losses is rice cultivation. The rice cultivation business causes losses because the process of rice cultivation is more complicated so it requires more workers and materials. The most profitable cultivation business is kenaf cultivation. It has an easy process to do, does not require special treatment, utilize simple supporting materials, and the plants itself are not easily attacked by pests. Therefore, the overall costs for kenaf cultivation is much lower for farmers. Besides that, the selling price of kenaf fiber is higher than the selling price of rice and corn.

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CONCLUSIONS

The results of an economic analysis of the cultivation of rice, corn and kenaf in Bonorowo land, Laren Subdistrict, are that corn and kenaf cultivation is feasible and profitable for farmers. On the contrary, rice cultivation is not feasible and results in losses for farmers. The NPV, IRR, and PI values of the corn cultivation business are Rp. 524,182.40; 144.43%; and 2.9, while the NPV, IRR, and PI values from the kenaf cultivation business are Rp. 1,145,532,39; 266.43%; and 5.15. Rice cultivation business leads to negative NPV, IRR, and PI values, which are Rp. -495,085.78; -25.18%; and -0.79. The selling price of kenaf fiber is higher than the selling price of rice and corn. Economically, farmers can still use Bonorowo land which has been considered unprofitable, by planting corn in the dry season and kenaf in the rainy season.

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