Profitability and Budgeting of Kenaf Cultivation and Fiber Production in Kelantan Districts

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Abstract—The purpose of the analysis is estimation of viability and profitability of kenaf plant farming in Kelantan State. The monetary information was gathered through interviewing kenaf growers as well group discussion. In addition, the production statistics were collected from Kenaf factory administrative group. The monetary data were analyzed using the Precision financial Calculator. For kenaf production per hectare three scenarios of productivity were adopted, they were 15, 12 and ten; the research results exposed that, when kenaf productivity was 15 ton and the agronomist received financial supports from kenaf administration, the margin profit reached up to 37% which is almost dual profitability that is expected without government support. The financial analysis explains that, the adopted scenarios of the productivity are feasible when Benefit Cost Ratio (BCR) was used as financial indicator. Nonetheless, the kenaf productivity of 15 ton is the superlative viable among the others and payback period is 5 years which equals to middle period time to return the invested amount back. The study concluded that for the farmer to increase the productivity of kenaf per hectare the well farming practices as well as continuously farmers financial support are highly needed.

Keywords—Margin profit, farming practices, financial analysis, kenaf cultivation.

I. INTRODUCTION

Kenaf Cultivation and Fiber Production

KENAF as natural fiber plant is deliberated as one of the most essential plants for ecofriendly products grew globally. Kenaf plants grown to produce natural fiber to be utilized into manufactured ecofriendly automotive parts were core and bast, see Fig. 1. The kenaf fibers were processed from the harvested stem. Hence, the growth and stem development of kenaf are considered as the main issues that should be attained for its successful profitable cultivation [1]

Fig. 1 Kenaf bast, core and pith [1]

The cultivation of kenaf plant on the loamy soil in Malaysia has a significant impact on the environment. Investigations are being conducted to evaluate the prospect of the commercializing kenaf and producing core and bast for the industry. This can lead to discussing kenaf cultivation and processing in the developing countries and their kenaf fiber industry. The purpose of producing kenaf fiber in Malaysia as a result of government encouragement to create an industry of natural fiber product will have environmental benefits locally and internationally as well as improve local production [2].

The study [3] matched the kenaf varieties which were grown in Malaysia; in their investigation, the parameters of gaseous exchange were assessed. Their f results depicted that KK60 was the most required variety for fiber production. The demand for kenaf crop has rapidly increased. Growing of the improved variety in Malaysia confronted many challenges when grown in sandy soil. The study [4] resulted in a solution of adding chicken manure to the soil.

II. METHODOLOGY

Cost Benefit Analysis Techniques

The data collected from Kelantan state were used to conduct cost benefit analysis for cultivated kenaf for producing natural fiber, there are numerous reasons behind the selection of Kelantan state. Reference [5] illustrated that, government of Malaysia planned to cultivate kenaf instead of tobacco area which is grown in Kelantan districts. Kelantan state is considered as commercial region for the purposes of growing this plant. Likewise, the report of the New Strait Times in [12] and [5] highlighted the significance of Kelantan in the current study as:

1- Kelantan farmers are recognized as most active business groups in the Malaysia.
2- In Kelantan the majority of the residents are involved in agriculture and fishing sectors.
3- Tobacco agri-business was introduced in 1960 to Kelantan agronomist by the National Company of Kenaf Tobacco Board (NKTB) and it is lowered by the traditional and religious belief.
4- The role of Asean Free Trade Agreement (2010) is to reduce Tobacco agricultural area and Kelantan people were the most affected with Tobacco growing.
5- Likewise increasing area of the kenaf farming in the districts caused a reduction in the grown areas of tobacco. Furthermore, Kelantan district is the region that the investigator had communicated session with agronomists

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practicing kenaf agronomy to extract fiber. Additionally, Kelantan is the region where kenaf factory for core and bast fiber was established.

The purpose of carrying out budgeting and financial analysis of kenaf cultivation for fiber production is to assist in providing markets knowledge, financial and economic data which will assist the policy makers for project consideration and to enrich the current financial knowledge of farmers in producing kenaf fiber to be utilized into industrial materials [6]. The revenue of growing kenaf by agronomists was evaluated following the methods of [7], the values estimated in the analysis were as follows:

1- Revenue: Gross income is defined as the total value of the kenaf fiber output productivity. It is calculated by multiplying average kenaf fiber yield by average price at the farm, grow income comprises the kenaf fiber productivity during one year, which was sold by the agronomists as the stem to NKTB.

2- Operating cost is defined as the total kenaf input cost containing tractor cost, rented labor cost, seeds, fertilizers, insecticides, fungicides, and herbicides costs. The machinery value consists of the opportunity cost or the hire cost for using tractor for acreage ploughing.

TABLE I
FINANCIAL VARIABLES OF KENAF CULTIVATION [8]

Variable Expenses	Sales revenue (kenaf stalk wt./ton x price)	= Net Sales+ Subsidies from LKTN
	Minus	
	Cost of Material:	Seeds. Fertilizer, pesticide, water, etc.
	Minus	
	Cost of Temporary .Labor	= Gross profit or gross margin (Return above variables Expenses
	Minus	
Fixed expenses	Cost of permanent labor	Salaries if found
	Minus	
	Annualized Cost of fixed assets	Fixed assets annual equivalent if found
	Minus	
	Land rent etc.	= Net profit before interest and tax
	Minus	
Financial Expenses	Interest on Capital Employed or invested	= Net profit before tax

TABLE II
CONVERSION ELEMENTS RELATED TO KENAF FIBER FINANCIAL ANALYSIS

1 RM = 0.28 USD
I Ha = 2.47 acre
1 gallon= 3.97 liters
1 working day = 8 hours
Kenaf price/ton = 500 RM

3- Total enterprise cost is defined as value of all kenaf farming inputs used in kenaf bast and core productivity. It is the total operating cost, the opportunity cost of capital and the opportunity cost of household or rented labor. Also, it is divided into the total variable cost and total fixed cost. Nevertheless, in this study, total fixed costs are left out. This research concentrated on valuating farm viability on a short-term basis. Since fixed costs are ignored in the short term, net returns were measured as gross income per unit of activity and valued in RM per hectare equivalent to USD.

4- Returns: Enterprise gross margin is known as the difference between gross income and operating cost. In the kenaf productivity, assessing the cost and benefit of this fibrous plant is urgently needed to ensure the continuing producing of kenaf fiber. This investigation will apply a cost and benefit analysis to evaluate both the net benefits of kenaf following the method in Table I which is adopted by [8] in Table II.

Data Collection

The Survey in Kelantan Districts

The purposes of the survey were to collect financial data of kenaf productivity and business behavior of agronomist as well as gathering diverse records curbing study problem [9]. Data of research were gathered from interviewees and focus group discussion with kenaf agronomists and NKTB workers. Additionally, for extra needed information, kenaf agriculturalist leaders were interviewed. Data of grown area and agronomists in the districts 2014 delivered from NKTB website were shown in Table III.

TABLE III
KENAF AREAS AND NUMBER OF AGRONOMISTS IN KELANTAN 2014 [13]

Kelantan districts	Number of farmers	Planted area in hectare
Pachok	113	180
Pasir mass	157	240
Pasir poteh	96	160
Total	366	580

Budgeting of Kenaf Cultivation and Fiber Production

Research applied the Cost Benefit Analysis (CBA) to value the viability of fiber productivity in the districts to quantify the followings:-

Viability of kenaf fiber productivity: This is computed using a period of ten years to conduct a financial analysis.

The formula used for fiber budgeting and profitability:

$$NPV= PV (B)-PV(C)$$

where NPV: Net Present Value; PV (B): Present Value of Benefit; PV (C): Present Value of Cost.

If the NPV is positive, then one should proceed with it, whereas if it is negative, one should note as this highlights the business management to be inefficient.

Benefit-Cost Ratio (BCR): BCR is to calculate the benefit gained per hectare and cost ratio of kenaf fiber productivity [10].

Assumption of Kenaf Budgeting and Profitability Variables

1- Total productivity and fiber price are constant.
2- Agronomists received constant revenue and cost for whole budgeting period.
3- Discount rate of 5% is used in computing costs and benefit analysis with each type of agronomists, it is interest rate

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which shows the biodiversity effect of the investment BCA scenarios.

The BCA comprises cash inflows and cash outflows were carried out in [11]. Nevertheless, the analysis of kenaf projection in fiber production investment costs, for instance economic capital, includes the administrative supports for kenaf farming. Furthermore, the kenaf inputs included labors, fertilizers, herbicides, pesticides and machineries as financial parameters and their ranges for sensitivity analysis are based on kenaf fiber productivity.

III. RESULT AND DISCUSSIONS

Profitability analysis of productivity displayed in Table I-III shows the scenario of kenaf productivity (15, 12 and 10); the investigation exposes that while kenaf productivity is 15 tones, the agronomist expected margin profit of 16% even without the financial support paid by NKTB. However, when the agronomist received financial support, the profitability maximized to 37% which is more than dual margin profit that is received without financial support. However, when kenaf productivity is 12 tons which is mentioned in Table II, the agriculturalist received margin profit of 21% after the financial delivered by NKTB. The result showed that there was no profit received if there are no subsidies provided. Additionally, the productivity of ten tons which is displayed in Table I showed the worst assumption that the agronomist received marginal profit valued as 5%. Result of computation concluded that productivity will be more cost-effective to the agronomist when productivity reaches 15 tones. Results exposed that kenaf farmers are in need to increase their area productivity for maximized the profitability. Reference [8] studied kenaf fiber productivity and depicted that kenaf fiber encounters numerous problems in maximized marginal profitability for European agronomists which did not encourage them to produce it. This negatively will affect the business chain which leads to use the technology for increasing the fiber productivity or reduced the inputs cost through production chain.

TABLE I
PROFITABILITY ANALYSIS OF KENAF PRODUCTION – SCENARIO A

Description	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Revenue	4350000	4350000	4350000	4350000	4350000	4350000	4350000	4350000	4350000	4350000
Direct Production cost	3233500	3233500	3233500	3233500	3233500	3233500	3233500	3233500	3233500	3233500
Farm supervision	329400	329400	329400	329400	329400	329400	329400	329400	329400	329400
Subtotal	3562900	3562900	3562900	3562900	3562900	3562900	3562900	3562900	3562900	3562900
Others	71258	71258	71258	71258	71258	71258	71258	71258	71258	71258
Total cost	3634158	3634158	3634158	3634158	3634158	3634158	3634158	3634158	3634158	3634158
Farmers' profit before subsidies	715842	715842	715842	715842	715842	715842	715842	715842	715842	715842
Subsidy	872910	872910	872910	872910	872910	872910	872910	872910	872910	872910
Farmers' profit after subsidies	1588752	1588752	1588752	1588752	1588752	1588752	1588752	1588752	1588752	1588752
Profit per farmer	4341	4341	4341	4341	4341	4341	4341	4341	4341	4341
Profit Margin without Subsidy	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%
Profit Margin with Subsidy	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%

TABLE II
PROFITABILITY ANALYSIS OF KENAF PRODUCTION – SCENARIO B

Description	2021	2022	2023	2024	2025	20269	2027	2028	2029	2030
Revenue	3480000	3480000	3480000	3480000	3480000	3480000	3480000	3480000	3480000	3480000
Direct Production cost	3233500	3233500	3233500	3233500	3233500	3233500	3233500	3233500	3233500	3233500
Farm supervision	329400	329400	329400	329400	329400	329400	329400	329400	329400	329400
Subtotal	3562900	3562900	3562900	3562900	3562900	3562900	3562900	3562900	3562900	3562900
Others	71258	71258	71258	71258	71258	71258	71258	71258	71258	71258
Total cost	3634158	3634158	3634158	3634158	3634158	3634158	3634158	3634158	3634158	3634158
Farmers' profit before subsidies	(154158.00)	(154158.00)	(154158.00)	(154158.00)	(154158.00)	(154158.00)	(154158.00)	(154158.00)	(154158.00)	(154158.00)
Subsidies	872910	872910	872910	872910	872910	872910	872910	872910	872910	872910
Farmers' profit after subsidies	718752	718752	718752	718752	718752	718752	718752	718752	718752	718752
Profit per farmer	1964	1964	1964	1964	1964	1964	1964	1964	1964	1964
Profit Margin Without Sub	-4%	-4%	-4%	-4%	-4%	-4%	-4%	-4%	-4%	-4%
Profit Margin with Subsidy	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%

Results in Table IV exposed the profitability and Benefit Cost Analysis of kenaf projection, the budgeting clarifies that, all the scenario are viable when BCR is considered as financial indicator and equals to more than one. Nevertheless, when core and bast productivity is 15 ton, the net present value is depicted as high and the payback period is 5 years which is half of the planning period that runs financial model, this indicated that achieving a productivity of 15 ton core and bast is the most recommended one.

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TABLE III
PROFITABILITY ANALYSIS OF KENAF PRODUCTION – SCENARIO C

Description	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Revenue	2900000	2900000	2900000	2900000	2900000	2900000	2900000	2900000	2900000	2900000
Direct Production cost	3233500	3233500	3233500	3233500	3233500	3233500	3233500	3233500	3233500	3233500
Farm supervision	329400	329400	329400	329400	329400	329400	329400	329400	329400	329400
Subtotal	3562900	3562900	3562900	3562900	3562900	3562900	3562900	3562900	3562900	3562900
Others	71258	71258	71258	71258	71258	71258	71258	71258	71258	71258
Total cost	3634158	3634158	3634158	3634158	3634158	3634158	3634158	3634158	3634158	3634158
Farmers' profit before subsidies	(734158.00)	(734158.00)	(734158.00)	(734158.00)	(734158.00)	(734158.00)	(734158.00)	(734158.00)	(734158.00)	(734158.00)
Subsidy	872910	872910	872910	872910	872910	872910	872910	872910	872910	872910
Farmers' profit after subsidies	138752	138752	138752	138752	138752	138752	138752	138752	138752	138752
Profit per farmer	379	379	379	379	379	379	379	379	379	379
Profit Margin Without Sub	-25%	-25%	-25%	-25%	-25%	-25%	-25%	-25%	-25%	-25%
Profit Margin Subsidy	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%

TABLE IV
PROFITABILITY AND BENEFIT COST ANALYSIS OF THE THREE SCENARIOS OF
KENAF PROJECT FOR KELANTAN AGRONOMISTS

Description	Case Scenario A	Case Scenario B	Case Scenario C
Production/ha	15	12	10
Profit Per Farmer	4,341	1,964	379
Profit Margin without Subsidy	16%	-4%	-25%
Profit Margin with Subsidy	37%	21%	5%
IRR	20%	7%	-3%
NPV	9,114,823	3,263,469	(1,970,768)
Pay Back Period	5 years	11.2 years	58 years
BCR	1.58	1.26	1.05

IV. CONCLUSION

The research of three adopted crop productivity indicated that kenaf productivity is monetarily feasible and maximize the profitability of kenaf growers in three districts when core and bast productivity was 12 and 15 tones. Additionally, these illustrated that the challenges faced by kenaf production are not the high cost of kenaf cultivation inputs, but the problem of increasing the productivity. Also, the research illustrates that there were additional productivity inputs such as kenaf seed varieties, soil analysis as well as nematodes and other climate issues distress core and bast productivity in need to be considered in future research.

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