Corn farming analysis in Babar Island, District of Babar Islands, Southwest Maluku Regency

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Abstract. Babar Island is corn production center in District of Babar Islands. Maize is the dominant food commodities and a major food source for the community. Corn is the dominant crop commodity in Babar Island and become staple food for the community. The farming are traditional and subsystems to meet farmers household needs and the excess (if any) will be sold but in very limited quantities. However the sales purpose is not commercial but just to meet the households needs that can not be substituted by other goods and only by few farmers if necessary. The farming is carried out on slash and burn dry land by polyculture cropping pattern that is combination of annual and perennial crops. This study aimed to examine the feasibility and profitability of corn farming in Babar island, using survey methods with stratified random sampling technique. The results showed that the cost of corn production in Babar Island, district of Babar Islands, South West Maluku Regency is consisted of fixed cost and variable cost. The fixed cost components is including : equipment depreciation costs and land rent costs. The variable costs includes : inputs costs (seeds, fertilizers, chemical) and labor costs. Variable costs is the largest cost component for corn farming. Corn farming is profitable and viable, as indicated by the average income Rp.2.647.396 compared to the average cost incurred by farmers Rp.2.520.934 and BC ratio of 1.05. This means that the production costs of Rp.2.520.934 will generate benefit 1.05 times of the cost.

1. Introduction
Babar island is corn production center in District of Babar Islands, Southwest Maluku Regency. The farming is carried out on dry land, traditional and subsystems. The cultivation is using slash and burn technique, located around and outside (forest) residential areas and still practice organic farming. The inputs are local with the use of family labor.

Farmers as much as possible reduce / avoid cash costs, except for equipment and post harvest tools (processing tool). Corn production is used as food stocks and not for commercial use.

Dryland farming systems are simple, use minimum cash costs, depending on nature, using local varieties without chemicals, no-tillage (TOT) or minimum tillage (OTS) and still hold strong local wisdom. This farming character is appeal to be observed whether the activities is profitable or economically viable if all production factors calculated.

In this study, all costs such as labor, seeds, fertilizer, chemical and marketing are taken into account as cash costs (incurred by farmers), although not exist in real terms. This calculation aims to provide an overview of all economic inputs and outputs that should be taken into account in corn farming
analysis such as the cost of production, revenue and income even the feasibility. This will give more relevant result than the real condition that can cause bias in interpreting the results. This study aims to analyse profit and feasibility of corn farming in Babar island.

2. Methods
The study carried out from October to December 2018, in 3 villages namely Village, Tela and Letsiara Village. The number of farmers sample is 120 persons (40 persons each village), using survey methods with multi-stage sampling technique. The villages is selected purposively while respondents selected by Stratified Random Sampling. Costs, revenues and income can be analyzed using the following formula.

Total cost can be calculated by adding fixed costs and variable costs by formula:

\[ TC = FC + VC \]

Where:
- \( TC \) = total cost
- \( FC \) = fixed cost
- \( VC \) = variable cost

Farming revenue can be calculated by multiplication of production (yield) with selling price which can be written by the following formula [1]

\[ TR = Q \times P \]

where:
- \( TR \) : total revenue
- \( Q \) : production (quantity)
- \( P \) : Selling Price (price)

\[ B = TR - TC \]

where:
- \( B \) : net income
- \( TR \) : total revenue
- \( TC \) : total cost

B/C ratio (Benefit Cost Ratio) used to determine the economic feasibility of corn farming. B/C ratio is the ratio between total income and total cost of farm production [2]. If the BCR > 1, then the farming is feasible, conversely, if the BCR < 1 then the farming is not feasible.

3. Results and discussion

3.1. Production Costs
Production cost is the summation of fixed cost and variable cost component that used in the production processes [3] Farming activities can not be separated from the use of various costs in the production process. The greater the revenue or the smaller the costs, then the farming will be more profitable or generated greater income [4].

3.1.1. Fixed Cost
Fixed costs are costs that are not influenced by the amount of production [2]. Fixed costs are also defined as costs that are not used up in the production process. These costs are formed due to the use of various agricultural inputs such as farm equipment. Fixed costs on corn farming can be seen at the following table.
Table 1. Average cost of equipment depreciation and land rent for corn farming in Babar Island, District of Babar Islands, Southwest Maluku Regency 2018.

| No | Fixed Cost Components | Value (Rp) |
|----|-----------------------|-----------|
| 1. | Chopping knife        | 42,933    |
| 2. | Hoe                   | 24,008    |
| 3. | Shovel                | 25,000    |
| 4. | Harrow                | 16,313    |
| 5. | Pakwel                | 24,392    |
| 6. | Ax                    | 43,725    |
| 7. | Crowbar               | 16,263    |
| 8. | Hand Sprayer          | 69,075    |
| 9. | Mixer                 | 278,958   |
| 10.| Land Rent             | 264,083   |
|    | Total                 | 804,750   |

Source: Primary Data, 2018 (Proceed)

Table 1 shows that the average total fixed cost is Rp. 804,750, consisted of equipment depreciation costs Rp. 540,667 and land rent costs Rp. 264,083. Equipment depreciation value is the highest cost component of fixed costs while the highest share of equipment cost is mixer namely Rp.278,958. The high cost of mixer compared to the other equipment is due to high price per unit namely Rp. 500,000 (manual mixer) and Rp. 2,500,000 (machine mixer) and owned by farmers as a means for corn processing.

3.1.2. Variable Cost

Variable costs are costs that are affected by the amount of production [2]. This cost is also known as consumables cost in a production process. This costs is one of the important cost component in the farming operation, because it deals with the means of production used by farmers. In practice, there are several components of variable costs that commonly used such as: seeds, fertilizers, chemical and labor. The average variable cost of corn farming is as follow:

Table 2. Average variable cost of corn farming in Babar Island, District of Babar Islands, Southwest Maluku Regency 2018.

| No | Variable Cost Components | Value (Rp) |
|----|--------------------------|-----------|
| 1. | Seeds                    | 234,392   |
| 2. | Fertilizer               | 627,938   |
| 3. | Chemical                 | 52,479    |
| 4. | Labor                    | 801,376   |
|    | Total                    | 1,716,184 |

Source: Primary Data, 2018 (Proceed)

Table 2 shows that, on average, total variable cost is Rp.1,716,184 consisted of inputs costs (Rp.914,809) and labor costs (Rp.801,376). The high of inputs cost is due to the need for fertilizer, Rp.627,938, seeds, Rp.234,392, and chemical Rp.52,479. The seeds produced locally (local variety) while fertilizer usually use organic fertilizer (ash from grass, weeds, corn stubbles and other forage) or manure.

Production costs as the summation of fixed costs and variable costs is shown in Table 3 below.
Table 3. Average Production Cost for Corn Farming in Babar Island, District of Babar Islands, Southwest Maluku Regency 2018.

| No  | Cost Components | Values (Rp) |
|-----|-----------------|-------------|
| 1.  | Fix Cost        | 804,750     |
| 2.  | Variable Cost   | 1,716,184   |
|     | Production Cost | 2,520,934   |

*Source: Primary Data, 2018 (Proceed)*

Table 3 shows that the average total production cost for corn farming is Rp.2,520,934, consisted variable costs (Rp.1,716,184) and fixed costs (Rp.804,750). Variable costs contributed most for the production process due to the needs of production input used in the production process and labor used.

3.2. Farm Revenue

Revenue is the multiplication between the production and the selling price. Farmer revenue depends on the size of production and selling price of the commodity on the market [5] Average farm revenue in Babar Island shown in Table 4 below.

Table 4. Average production, Selling price and Farm Revenue for Corn Farming in Babar Island, District of Babar Islands, Southwest Maluku Regency 2018.

| No  | Description  | Values (Rp) |
|-----|--------------|-------------|
| 1.  | Production   | 1,124       |
| 2.  | Selling Price| 4,600       |
|     | Revenue      | 5,168,330   |

*Source: Primary Data, 2018 (Proceed)*

Table 4 shows that the average revenue of corn farming is Rp.5,168,330 with average production (dry shelled) is 1.124 kg and selling price Rp.4,600. Prevailing selling price at farmers level ranged between Rp.4000-5000/kg.

3.3. Farm Income

The success of a farm can be seen from the level of income received by farmers from their farm operation. Or in other words, the profit depends on total revenue and total production costs incurred by the farmers [6]. Table 5 shows the average income of corn farming.

Table 5. The average of revenue, Production cost and Income for Corn Farming in Babar Island, District of Babar Islands, Southwest Maluku Regency 2018.

| No  | Description  | Values (Rp) |
|-----|--------------|-------------|
| 1.  | Revenue      | 5,168.30    |
| 2.  | Production Cost | 2,520.934 |
|     | Income       | 2,647.396   |

*Source: Primary Data, 2018 (Proceed)*

Table 5 shows that corn farming income is Rp.2,647.396, that obtained from the revenue of Rp.5,168.330 less the production cost of Rp.2,520.934. These results indicate that farmers earn profit from corn farming, because the revenue is greater than the costs incurred during the production process.

3.4. Feasibility Analysis

Benefit Cost Ratio (BCR) is a comparison between the income earned by farmers and costs incurred during the production process, and these values are used to analyze the feasibility of corn farming [7] The average value of the B/C ratio of corn farming shown in table 6 below.
Table 6. The average value of the B/C ratio of corn farming in Babar Island, District of Babar Islands, Southwest Maluku Regency 2018.

| No | Description            | Value (Rp) |
|----|------------------------|------------|
| 1. | Income                 | 2.647.396  |
| 2. | Production Cost        | 2.520.934  |

B/C Ratio 1.05

Source: Primary Data, 2018 (Proceed)

Table 6 shows that the Benefit Cost Ratio (BCR) of corn farming is higher than one (BCR > 1). This indicated that corn farming on Babar island is profitable and feasible. The value of B/C ratio is 1.05, indicates that the incurred cost of Rp.2.520.934 will generate profit 1.05 times the cost.

4. Conclusion and Recommendation

4.1. Conclusion
1. Production cost of corn farming in Babar island, District of Babar Islands, Southwest Maluku regency consists of fixed cost and variable costs. Fixed costs include: equipment depreciation expense and land rental costs and variable costs include inputs cost (seeds, fertilizers, pesticides) and labor costs. Variable costs contributed most to the production cost of corn farming.
2. The analysis results of cost, revenue and income showed that corn farming is profitable with income of Rp.2.647.396 as the difference between farm revenue (Rp.5.168.330) with production costs (Rp.2.520.934)
3. Corn farming in Babar island is feasible because the value of BCR (benefit cost ratio) is greater than one (BCR > 1). The value of BC ratio is 1.05 illustrates that corn farming will make a profit of 1.05 times the production cost of Rp.2.520.934.

4.2. Recommendation
Farmers need to make production planning such as: efficient use of inputs, anticipated planting time due to growing season and rainfall as well as maintain environmental balance to make the farming sustainable in Babar island.

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