

Analysis of Farming And Marketing of Lettuce in Hydroponic and Conventional Systems in Seberida Sub-District, Indragiri Hulu District, Riau Province

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Abstract. Lettuce farming aims to develop and sell hydroponic and conventional lettuce products to meet the increasing demand. Market demand for lettuce has not been fully met by farmers, so lettuce business development is needed to overcome this condition. This study aims to: 1) Characteristics of farmers, traders, and farming profiles of hydroponic and conventional lettuce systems in Seberida District, Indragiri Hulu Regency, Riau Province; 2) Hydroponic and conventional lettuce farming in Seberida Sub-district; 3) Marketing of hydroponic and conventional lettuce in Seberida District. The research method used was survey with primary data. The results showed that: 1) The average age of hydroponic farmers is 31 years, conventional farmers are 58 years, and traders are 45 years; education of hydroponic farmers is high school, conventional farmers are elementary school, and traders are high school; business experience of hydroponic farmers is 7 years, conventional farmers are 16 years, and traders are 11 years. 2) Hydroponic farming using NFT system cost Rp 6,400,233/MT and net income Rp 6,649,767/MT (RCR 2.04). Conventional farming costs Rp 2,923,575/MT with a net income of Rp 2,051,425/MT (RCR 1.70). 3) Hydroponic lettuce marketing is through two channels: Farmer-kebab trader-consumer (efficiency 2.50%, Farmer's Share 75%) and Farmer-retailer-consumer (efficiency 5.71%, Farmer's Share 85.71%). Conventional lettuce marketing is through one channel: Farmer-retailer-consumer (efficiency 7.14%, Farmer's Share 89.29%). Traders earn more profit than farmers. Hydroponic and conventional lettuce development policies in Seberida Sub-district have not been implemented optimally.

1. Introduction

Lettuce (*Lactuca sativa*. L) is a type of vegetable plant that is used and utilised by the community as fresh vegetables. Lettuce has great potential as a provider of important mineral elements needed by the body because of its high nutritional value. Lettuce has vitamin C content and folic acid which is efficacious in helping important reactions of amino acid metabolism as well as helping the formation of red blood cells and white blood cells in the bone marrow, preventing cancer, increasing endurance and overcoming insomnia.

In the development of conventional and hydroponic lettuce farming in Seberida District, there are problems such as:

1. Conventional lettuce does not last long, only 1-2 days, while hydroponic lettuce can last up to 2 weeks at room temperature and 1 month if stored in the refrigerator.
2. Lettuce farmers still use conventional methods, farmers' education is still low, the lettuce business is still small scale, and is done traditionally,
3. Mastery of conventional lettuce farmer technology is still low (tillage is still manual using a hoe),
4. Marketing, conventional lettuce is not packaged.

Meanwhile, the problems of hydroponic lettuce in Seberida District have problems such as:

1. There is a lack of interest from farmers to switch to hydroponic farming, even though the potential and market opportunities are available,
2. There are still some people who think that hydroponic lettuce contains harmful chemicals,

The objectives of this research are :

1. To analyse the characteristics of entrepreneurs, traders and business profiles of lettuce hydroponic and conventional systems in Seberida District, Indragiri Hulu Regency, Riau Province.
2. To determine the analysis of lettuce farming business in hydroponic and conventional systems in Seberida District, Indragiri Hulu Regency, Riau Province.
3. To determine the marketing of lettuce hydroponic and conventional systems in Seberida District, Indragiri Hulu Regency, Riau Province.
4. To find out the strategy of farming business development and marketing of lettuce hydroponic and conventional systems in Seberida District, Indragiri Hulu Regency.

2. Research Methods

2.1 This study used a survey method,

The research location was carried out in Seberida District, Indragiri Hulu Regency. Determination of the research area with the consideration that Seberida District is the centre of hydroponic and conventional lettuce business. The farmer population consists of 2 sub-populations, namely the hydroponic farmer sub-population and the conventional farmer sub-population, the total population of hydroponic farmers is 2 farmers and the conventional farmer population is 2 farmers. The technique of determining respondents in this study is to use the census research method.

2.2. Sample Collection Technique

The sampling technique in this study is to use the census research method. Census research is research that takes one population group as a whole sample and uses a structured questionnaire as the main data collection tool to obtain specific information [1]. Based on this information, the respondents who were used as a sample were all farmers who worked in the hydroponic vegetable section in Seberida sub-district, consisting of 3 people.

2.3. Types and Sources of Data

The data sources used in this research are as follows:

1. Primary data

Primary data is obtained through direct observation to the research site, namely in Seberida District, Indragiri Hulu Regency. In addition, primary data in the form of interviews can be conducted if needed to complete information about the object of research, namely lettuce vegetable farming.

2. Secondary data

Secondary data is data that comes from second sources obtained indirectly through internet media (official website of an institution / agency, e-book, pdf. Browser and articles related to research.

2.4. Data Collection Techniques

The data collection techniques used in this study are:

1. Observation

Observation is data collection by making direct observations of hydroponic and conventional lettuce cultivation farmers by going directly to the field.

2. Interview

Interview is giving a set of questions or written statements to hydroponic and conventional lettuce cultivation farmers to obtain in-depth information. In the case of interviews conducted with the process of question and answer to farmers hydroponic and conventional lettuce

cultivation using the census research method with a questionnaire as a structured tool as a data collection tool.

3. Documentation

Documentation is the collection of documents that can provide information or evidence related to the process of collecting and managing documents systematically and disseminating to users of information such as images, other references that have to do with this research.

2.5. Analysis of Salada Farming Development Strategy : SWOT Analysis

2.6. Data analysis using the income analysis formula

- a. To calculate the total cost of hydroponic and conventional lettuce vegetable farming as follows:

To find out all the costs required, the following calculation can be used:

$$TC = FC + VC$$

Description:

TC = Total Cost

FC = Fixed Cost

VC = Variable Cost (Variable Cost)

- b. To calculate the acceptance of hydroponic lettuce vegetable farming as follows:

Acceptance (revenue) farming is all nulai products produced from a farm in a particular period, one growing season or in one year of farming activities. According to [2],

$$\pi = TR - TC$$

$$\pi = (Y.Py) - (TVC + TFC)$$

Description:

Π = Business Profit / net income (Rp)

TR = Total Revenue / gross income (Rp)

Py = Production Price (Rp/Kg)

Y = Total Production (Rp/Kg/year)

TC = Total Cost / total expenditure (Rp)

TFC = Total Fixed Cost / fixed cost (Rp)

TVC = Total Variable Cost / variable cost (Rp)

- c. Analyse the data using the feasibility analysis formula

- Revenue-Cost Ratio Analysis

Analysis of the ratio of revenue and cost (R / C ratio) is used to determine how well each rupiah value of costs incurred can provide a number of values as benefits [3].

The formula used in calculating the R/C ratio is as follows [4].

$$RCR = \frac{TR}{TC}$$

3. Results and Discussion

3.1 Farmer Characteristics and Farming Profile

a. Farmer Characteristics

Based on Table 1, the age of hydroponic lettuce farmers is 37 years old, conventional lettuce farmers are 58 years old, traders are 45 years old, the gender of hydroponic lettuce farmers and conventional farmers and traders are mostly male, the education level of hydroponic farmers and traders are high school graduates, conventional farmers are elementary school graduates, the experience of hydroponic and conventional farmers is 6-10 years, traders are 7 years old, family dependents of hydroponic lettuce farmers and conventional farmers and traders are 3-4 people on average.

Based on Table 1. Conventional lettuce farming has one marketing channel, namely: Farmer → Retailer → Consumer (Efficiency 7.14%, Farmer's Share 89.29%).

Table 1. Characteristics of Hydroponic Farmers, Conventional Farmers in Seberida District, Indragiri Hulu Regency in 2023

No	Karakteristik	Hydroponic Farmers		Farmer Konvensional		Marchants	
		Total (jiwa)	Persentase (%)	Total (jiwa)	Persentase (%)	Jumlah (jiwa)	Persentase (%)
1	Age (Year)						
	a. 28-38	2	100	-	-	6	30
	b. 39-49	-	-	-	-	8	40
	c. 50-60	-	-	1	50	6	30
	d. 61-71	-	-	1	50	-	-
2	Gender						
	a. Man	2	100	2	100	11	55
	b. Women	-	-	-	-	9	45
3	Level : Education						
	a. SD	-	-	2	100	1	5
	b. SMP	2	100	-	-	3	15
	c. SMA	-	-	-	-	16	80
4	Business Experience (Tahun):						
	a. 1- 5	-	-	-	-	1	5
	b. 6-10	2	100	-	-	7	35
	c. 11-15	-	-	-	-	12	60
	d. 16-20	-	-	2	100	-	-
5	Number of family dependents:						
	a. 1-2	-	-	-	-	3	15
	b. 3-4	2	100	2	100	16	80
	c. 5-6	-	-	-	-	1	5

b. Farm Profile

Based on Table 2. The variety used by hydroponic lettuce farmers is the caipira variety while conventional lettuce farmers are red arrow varieties, the form of business carried out by hydroponic lettuce farmers and conventional lettuce farmers is a form of individual business (small), with the source of capital for hydroponic lettuce farming and conventional lettuce is their own capital and hydroponic lettuce farming and conventional lettuce in Seberida Subdistrict predominantly uses labour in the family (TKDK) of 85.39%.

Table 2. Profile of Hydroponic Lettuce and Conventional Lettuce Farms in Seberida Sub-district, Indragiri Hulu Regency per business in 2023.

No	Profil	Hydroponic Farmers		Conventional Farmers	
		Total	%	Total	%
1	Varietas		100		
	a. Caipira	2	-	-	-
	b. Red Arrow	-		2	100
2	Form of Busines		100		
	a. Individual	2	-	2	100
	b. Family	-	-	-	-
	c. Company	-		-	-
3	Capital Source		100		
	a. Own Capital	2	-	2	100
	b. Loans	-		-	-
4	Labour		100		
	a. TKDK	8,63	-	12,75	86,44
	b. TKLK	-		2,00	13,56

3.2 Farm Analysis

1. Hydroponic and Conventional Lettuce Farming Cultivation Technology

Hydroponic lettuce farming cultivation technology: Using the NFT system, AB Mix nutrition, caipira seeds planting and maintenance according to standards, harvest after 35 HST. b). Conventional lettuce farming cultivation technology: Red arrow seeds, three-stage tillage: cleaning, ploughing, and hoeing, fertilisation and maintenance according to standards, harvesting after lettuce forming crops.

2. Production Factors

Production factors will provide optimal production results. The use of production factors such as land, seeds, fertilisers, medicines does not fully guarantee that production will be better if the efficiency of their use is not considered. Therefore, it is necessary to use efficiency through proper allocation so that the resulting production can be good, as well as allocating labour.

Based on Table 3 a). hydroponic lettuce: 2,230 planting holes, 42 MT/planting hole (caipira variety). AB Mix nutrient: 14 42 per MT/planting hole. Labour 17.25 TKDK. b). Conventional lettuce: Land: 0.25 Ha/MT or 1.00 Ha/MT. Seed: 336 Grams/Garapan or 1,344 Grams/MT (red arrow variety). Dolomite: 25 Kg/Agriculture or 100 Kg/MT. Compost: 27.91 Kg/harvest or 110 Kg/MT. NPK: 3 Kg/harvest or 12 Kg/MT. Previcur: 65 Ml/harvest/MT or 260.00 Ml/MT. TKDK labour: 12.75 HOK/harvest or 51.00 HOK/Ha, TKDK labour: 2.00 HOK/harvest or 6.00 HOK/Ha.

3.3 Costs, Production, Income, and Farming Efficiency

1. Hydroponic Lettuce

Based on Table 4, the net income of hydroponic lettuce farmers is Rp 6,649,767 Garapan/MT or Rp 26,299,067 Ha/MT with farming efficiency measured by the Cost Revenue Ratio (RCR) which reaches 2.04. This figure shows that every Rp 1 invested in hydroponic lettuce farming yields Rp 2.04, which means that this farm is profitable and worthy of further development. Farmers can improve efficiency through the application of new technologies and better agribusiness practices

Table 3. Total Use of Average Production Factors of Hydroponic and Conventional Lettuce Farming in Indragiri Hulu Regency.

No	Factor utilization Production	Number of uses Hydroponic Lettuce	
A	Hydroponic Lettuce	Per MT/ Planting Hole	
1.	System (planting hole)	4.230	
2.	Hydroponic Lettuce Seeds (Gram)	42	
3.	Lettuce Nutrition		
a.	AB Mix (liter)	14	
4.	Labour		
a.	TKDK	17,25	
b.	TKLK	0,00	
B	Conventional Lettuce	Grpn/MT	Ha/MT
1.	Land	0,25	1
2.	Lettuce Seeds (Grams)	336	1.344
3.	Fertilisers & Pesticides Lettuce		
a.	Dolomit (Kg)	a. 25	a. 100,00
b.	Kompos (Kg)	b. 27,91	b. 110,00
c.	NPK (Kg)	c. 3,00	c. 12,00
d.	Previcur (ml)	d. 65	d. 260,00
4.	Labour		
a.	TKDK	a. 12,75	a. 51,00
b.	TKLK	b. 2,00	b. 6,00

Table 4. Average Costs, Production, Income, and Efficiency of Hydroponic Lettuce Farming in Seberida Subdistrict in 2023.

No	Description	Total		Price (Rp)	Value (Rp/MT)		Persen (%)
		Garapan	MT		Garapan	MT	
1	Production (Kg)	435	1.740	30.000			
2	Gross Revenue (Rp)	-	-	-	13.050.000	52.200.000	
3	Cost	-	-	-	-	-	-
	A. Fixed Costs (Rp)	-	-	-	-	-	-
	1. Tool Depreciation	-	-	-	2.424.333	9.697.333	37,87
	B. Variable Costs (Rp)	-	-	-	-	-	-
	1. Seed (Gram)	42	168	62.500	2.550.000	10.500.000	39,84
	2. AB MIX (Ltr)	14	54	10.000	135.000	540.000	2,11
	3. Rockwoll (Unit)	4.230	16920	100	423.000	1.692.000	6,61
	4. Listrik (Watt)	259	1036	600	155.400	621.600	2,43
	2. Labour (Rp)	-	-	-	-	-	11,13
	a. TKDK (HKP)	8,63	34,5	-	712.500	2.850.000	-
	b. TKLK (HKP)	-	-	-	-	-	-
	Total Variable Cost (Rp)	-	-	-	3.975.900	16.203.600	-
	C. Total Cost (Rp)	-	-	-	6.400.333	25.900.933	100%
4	Revenue (Rp)	-	-	-	6.649.767	26.299.067	-
5	Efficiency (RCR)	-	-	-	2,04	2,04	-

2. Conventional Lettuce

Based on Table 5, the net income of conventional lettuce farmers is Rp. 2,051,425 Ha/MT or Rp 365,447 Ha/MT with farming efficiency measured by the Cost Revenue Ratio (RCR) which reached 1.70. This figure shows that every Rp 1 invested in conventional lettuce farming yields Rp 1.70, which means that this farm is profitable and worthy of further development. Farmers can improve efficiency through the application of new technologies and better agribusiness practices.

Table 5. Average Costs, Production, Income and Efficiency of Conventional Lettuce Farming in Seberida District in 2023.

No	Description	Total	Price(Rp)	Value (Rp/MT)		Persen
		Garapan/MT		Garapan/ MT	Ha/MT	(%)
1	Production (Kg)	199	25.000			
2	Gross Revenue (Rp)	-	-	4.975.000	621.875	
3	Cost	-	-	-	-	-
	A. Fixed Costs (Rp)	-	-	-	-	-
	1. Tool Depreciation	-	-	82.000	10.250	2,80
	B. Variable Costs (Rp)	-	-	-	-	-
	Seed (Gram)	336	-	168.000	21.000	5,75
	Land rent	0,25	3.000.000	750.000	93.750	25,65
	1. Fertiliser (Kg)	-	-	425.500	53.188	14,55
	a. Dolomit	25	10.000	250.000	31.250	-
	b. Kompos	28	4.200	115.500	14.438	-
	c. NPK	3	20.000	60.000	7.500	-
	Medicines (Ml)	65	355	23.075	2.884	0,79
	2. Labour (Rp)	-	-	1.475.000	184.375	50,45
	a. TKDK (HKP)	12,75	-	1.275.000	159.375	-
	b. TKLK (HKP)	2,00	-	200.000	25.000	-
	Total Variable Cost (Rp)	-	-	2.841.575	355.197	-
	C.Total Biaya (Rp)	-	-	2.923.575	365.447	100
4	Pendapatan Bersih (Rp)	-	-	2.051.425	256.428	-
5	Efesiensi (RCR)	-	-	1,70	1,70	-

3. Marketing of hydroponic and conventional lettuce in Seberida Sub-district

a. Hydroponic Lettuce

Based on Table 6. Hydroponic lettuce farming has two marketing channels, namely:

- Farmers → kebab traders → Consumers (Efficiency 2.50%, Farmer's Share 75.00%).
- Farmers → Retailers → Consumers (Efficiency 5.71%, Farmer's Share 85.71%).

Table 6. Marketing Cost, Marketing Margin, Profit Margin, Marketing Efficiency and Farmer's Share of Hydroponic Lettuce in Seberida District, Indragiri Hulu Regency in 2023.

No	Description	Channel I		Channel II	
		Rp/Kg	%	Rp/Kg	%
1	Farmer/Producer	-	-	-	-
	A. Selling Price of Hydroponic Lettuce (Rp/Kg)	30.000		30.000	
2	Kebab Merchant	-	-	-	-
	A. Price of hydroponic lettuce from farmers (Rp/Kg)	30.000	75,00	-	-
	B. Transport and Packaging Costs (Rp/Kg)	1.000	2,50	-	-
	C. Marketing Margin of kebab traders (Rp/Kg)	10.000	25,00	-	-
	D. Profit Margin of Kebab Traders (Rp/Kg)	9.000	22,50	-	-
	E. Selling price of kebabs to consumers (8 kebab/Kg Selada)	40.000	100,00	-	-
3	Diluent Trader	-	-	-	-
	A. Price of hydroponic lettuce from farmers (Rp/Kg)	-	-	30.000	85,71
	B. Transport and Packaging Cost of Hydroponic Lettuce (Rp/Kg)	-	-	2.000	5,71
	C. Retailer Marketing Margin (Rp/Kg)	-	-	5.000	14,29
	D. Retailer Profit Margin (Rp/Kg)	-	-	3.000	11,43
	E. Selling price of hydroponic lettuce from retailers to consumers	-	-	35.000	100,00
4	Total Marketing Cost (Rp/Kg)	1.000	-	2.000	-
5	Total Marketing Margin (Rp/Kg)	10.000	-	5.000	-
6	Total Profit Margin (Rp/Kg)	9.000	-	3.000	-
7	Efesiensi Marketing	2,50%	-	5,71%	-
8	Farmer's Share	75,00%	-	85,71%	-

b. Conventional Lettuce

Based on Table 7. Conventional lettuce farming has one marketing channel, namely: Farmer → Retailer → Consumer (Efficiency 7.14%, Farmer's Share 89.29%).

Table 7. Marketing Cost, Marketing Margin, Profit Margin, Marketing Efficiency and Farmer's Share of Conventional Lettuce in Seberida District, Indragiri Hulu Regency in 2023.

No	Description	Value(Rp/kg)	Persentase(%)
1	Farmer/Producer		
	A. Conventional Lettuce Farmer Selling Price	25.000	89,29
2	Merchants		
	A. Purchase Price of Conventional Lettuce from Farmers	25.000	89,29
	B. Conventional Lettuce Transport and Packaging Costs (Rp/Kg)	2.000	7,14
	C. Merchant Marketing Margin (Rp/Kg)	3.000	10,71
	D. Merchant Profit Margin (Rp/Kg)	1.000	3,57
	E. Selling Price of Conventional Lettuce Trader to Consumer	28.000	100,00
3	Total Marketing Cost (Rp/Kg)	2.000	
4	Marketing Advantage (Rp/Kg)	3.000	
5	Marketing Efficiency		7,14
6	Farmer's Share		89,29

4. Conclusions

The conclusions obtained from this study are: 1) The average age of hydroponic farmers is 31 years old, conventional farmers are 58 years old, and traders are 45 years old; education of hydroponic farmers is high school, conventional farmers are elementary school, and traders are high school; business experience of hydroponic farmers is 7 years, conventional farmers are 16 years old, and traders are 11 years old. 2) Hydroponic farming using NFT system cost Rp 6,400,233/MT and net income Rp 6,649,767/MT (RCR 2.04). Conventional farming costs Rp 2,923,575 /MT with a net income of Rp 2,051,425 /MT (RCR 1.70). 3) Hydroponic lettuce marketing is through two channels: Farmer-kebab trader-consumer (efficiency 2.50%, Farmer's Share 75%) and Farmer-retailer-consumer (efficiency 5.71%, Farmer's Share 85.71%). Conventional lettuce marketing is through one channel: Farmer-retailer-consumer (efficiency 7.14%, Farmer's Share 89.29%). 4) Traders get more profit than farmers. Hydroponic and conventional lettuce development policies in Seberida Sub-district have not been implemented optimally.

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