The Social Costs of People's Salt Industry Using the Policy Analysis Matrix in Bima Regency

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ABSTRACT

The research aims to: (1) Analyse the social costs of the people's salt industry in Bima Regency; (2) Analyse the private and social benefits of the people's salt industry in Bima Regency; (3) Determine the obstacles faced by farmers in the people's salt industry in Bima Regency. The analytical method used in this research is descriptive, while data collection is conducted through a survey. The unit of analysis used in this research is the people's salt industry actors in Bima Regency. This research was conducted in two sub-districts, namely Woha Sub-district in Talabiu Village and Bolo Sub-district in Sanolo Village, using "Purposive Sampling". Respondents were selected using "Quota Sampling", and the number of respondents was determined using the "Slovin" formula, resulting in 43 respondents. The selection of respondents as a sample was carried out using "accidental sampling". The data types are quantitative and qualitative, and the data sources are primary and secondary. The results of the study show: (1) The social costs of the people's salt industry in Bima Regency are IDR 12,304,889/ha; (2) The private profit of the people's salt industry in Bima Regency is 1,328,480 / ha, while the social profit is IDR 6,140,355 / ha. The B/C ratio value is 0.33 (B/C ≥ 0). Thus, the people's salt industry in Bima Regency is feasible to be developed from an economic and social perspective; (3) The main obstacles faced by the people's salt industry in Bima Regency are marketing and unstable selling prices with 17 respondents (39.53%), followed by capital and marketing constraints with 13 respondents (30.23%), and unstable weather, quality, and selling prices with 10 respondents (23.26%). Meanwhile, the smallest obstacles are capital and weather, with 3 respondents (6.98%). This shows that the marketing aspect is the biggest and most urgent problem to be addressed in developing the people's salt industry.

Keywords: Social costs, people's salt industry, Policy Analysis Matrix (PAM).

INTRODUCTION

Indonesia, as the world's largest archipelagic country with the second-longest coastline after Canada at 99,093 km, has tremendous potential in the salt production sector. However, the country still relies on salt imports to meet domestic needs (Marfai, 2023). According to research by Ghozali and Samputra (2022), insufficient domestic salt production still requires the government to import salt, especially industrial salt, which accounts for the bulk of domestic demand. Salt itself is a national strategic commodity that is used not only in the food sector but also is very important in the chemical, pharmaceutical, and various other sectors such as chemicals, textiles, pharmaceuticals, detergents, oil and gas, and clean water treatment (Amin, 2023; Amir *et al.*, 2023). The use of salt in the industrial sector has the potential to increase added value, boost state revenue and foreign exchange, create jobs, and contribute to GDP (Ghozali & Samputra, 2022; Mardiyanta & Ermawan, 2023).

West Nusa Tenggara (NTB) is one of the major salt-producing areas, with NTB's contribution to total national salt production reaching approximately 8%. Salt production in NTB is estimated at 216,000 tons per year, with the main centres in Bima, Dompu, and East Lombok Regencies. The productive land area in this area is approximately 3,200 ha, although currently only around 2,850 ha is actively managed for the salt industry (Hakim *et al.*, 2023). Bima is one of the regencies in NTB province known as a major centre of salt production, accounting for approximately 40% of the province's total salt output, namely approximately 86,400 tons per year. The potential land for salt production activities in this region reaches approximately 1,641.59 ha, spread across five sub-districts: Woha, Bolo, Lambu, Sape, and Palibelo (Bima Regency Marine and Fisheries Agency, 2024).

In the production activities of the people's salt industry in Bima Regency, farmers often face challenges, one of which is unfamiliarity with comprehensively calculating all costs incurred, including raw materials, equipment, labour wages, and social costs arising during the production process. This occurs because most salt farmers have limited knowledge of cost accounting and are not yet accustomed to using a comprehensive economic approach in managing their businesses. As a result, many salt farmers do not include the social cost component in their calculations, leading to an inaccurate picture of the actual profits they earn. Considering this, people's salt farmers must try to compare actual prices and social prices, as this can affect the sustainability of the people's salt industry in the future. Therefore, an economic assessment approach is needed that can describe all costs, including the industry's social costs. The research aims to: (1) Analyse the social costs of the people's salt industry in Bima Regency; (2) Analyse the private and social benefits of the people's salt industry in Bima Regency; (3) Identify the obstacles faced by farmers in the people's salt industry in Bima Regency.

MATERIALS AND METHODS

This study uses a descriptive method to examine the social costs of the smallholder salt industry in Bima Regency (İlter, 2023; Pradana & Arijanto, 2024; Nazir, 2014). The unit of analysis in this study is the smallholder salt industry actors in Bima Regency. This research was conducted in Woha District (Talabiu Village) and Bolo District (Sanolo Village), Bima Regency. The research location was determined through purposive sampling, given that the two villages are centres of smallholder salt production in Woha and Bolo Districts, Bima Regency. Respondents were selected by *accidental sampling,* and the sample size was calculated using the Slovin Formula (Budi, 2024).

$$n = \frac{N}{N(e)^2 + 1}$$

Information:

n = Number of samples

N = Number of members in the population

e = Precision Level 15% (0.15)

Data analysis

The data analysis in this study uses a Cost-Benefit-Policy Analysis Matrix (PAM). The formulas used are as follows:

1. Cost, Revenue, and Profit Analysis

According to (Soekartawi, 1995, cit Ulfiyah, 2023) to calculate the amount of costs used, income, and profits received in the people's salt industry, the following formula is used:

a. Cost

$$TC = TFC+TVC$$

Information:

TC = Total *Cost* (Total Production Cost)

TFC = Total *Fixed* Cost

TVC = Total Variable *Cost*

b. Reception

$$TR = Y \times P$$

Information:

TR = Total *Revenue*

Y = Amount of production produced

P = Selling price

c. Profit

$$I = TR - TC$$

Information:

I = Profit (Income) (IDR)

TR= Total Revenue (IDR)

TC= Total Production Cost (IDR)

2. PAM Analysis (*Policy Analysis Matrix)*

PAM (*Policy Analysis Matrix)* analysis is used to determine private benefits, social benefits and social costs, as stated in Table 1 as follows:

Table 1. Structure of Policy Analysis Matrix

Description	Reception	Cost		Profit
		Tradable	Non-Tradable	
Private Price	A	B	C	D
Social Price	E	F	G	H
Policy Impact	I	J	K	L

Source: Monke, EA and Pearson, SR (1989) The Policy Analysis Matrix for Agricultural Development

Information:

A: Private income is production multiplied by market price (IDR)

B: Cost of tradable inputs multiplied by market price (IDR)

C: Cost of domestic factor input multiplied by market price (IDR)

D: Private Profit (D = A – (B+C))

E: Social acceptance is production multiplied by social price (IDR)

F: Tradable inputs multiplied by market price (IDR)

G: Domestic factor input multiplied by social price (IDR)

H: Social Benefits (H = E – (F+G))

I: Transfer Output (I = A – E)

J: Input Transfer (J = B – F)

K: Transfer Factor (K = C – G)

L: Net Transfer (L= D – H) or (L = I – J – K)

Several PAM Analysis Results Indicators are as follows:

Social Cost Analysis

Determination of social costs is the total cost of production inputs (*Tradable Inputs)*, Social and Non-tradable Inputs. *Social* costs are calculated based on shadow prices. Thus, social costs reflect the real economic value of resources used in the production process, unaffected by market distortions or government policy interventions. The formula used is as follows (Monke & Pearson, 1989):

$$BS = F + G$$

Information:

BS = Social Cost

G = Cost of *Social Tradable Inputs*

F = *Social Non-Tradable* Input Costs

2. Analysis of Private and Social Benefits

a. Private Benefits

Private profit is an indicator of the social costs of a technology-based commodity system, reflecting output value, input costs, and various forms of policy transfers in effect. If the value of private profit is greater than zero (D > 0), the commodity system is earning a profit above normal cost. This condition indicates that the business activity or production of the commodity is economically feasible for further development or expansion. The formula used is as follows (Monke & Pearson, 1989):

$$D = A – (B + C)$$

Information:

D = Private Profit

A = Private Acceptance

B = Private Tradable Input Costs

C =Private Non-Tradable Input Costs

b. Social Benefits

Social profit is an indicator of the social cost of a commodity in the absence of divergence, whether caused by government policy intervention or market distortion. If the social profit value is greater than zero (H > 0), the commodity system is earning a profit above normal costs based on social prices. The formula used is as follows (Monke & Pearson, 1989):

$$H = E – (F + G)$$

Information:

H = Social Benefit

E = Social Acceptance

F = Cost of Social Tradable Inputs

G = Social Non-Tradable Input Costs

3. Obstacles in the People's Salt Industry

The obstacles faced by smallholder salt farmers can be identified through direct interviews with smallholder salt entrepreneurs, using a list of questions, and then analysed descriptively.

RESULTS AND DISCUSSION

Cost and Benefit Analysis

1. Production Cost Analysis

Production costs in the artisanal salt industry include variable and fixed costs. A breakdown of the production costs incurred by farmers during their artisanal salt business can be seen in Table 2 below:

Table 2. Average Production Costs in the People's Salt Industry in Bima Regency in 2025

No	Description	Unit	/ LLG (0.45 Ha)		/Ha	
			Amount	Value (IDR)	Amount	Value (IDR)
1	Variable Costs					
	a. Production Facilities:					
	Fuel					
	➢ Pertalite	(ltr)	3.49	34,884	7.68	76,805
	➢ Oil	(Bottle)	1.28	63,953	2.82	140,809
	Bag	(Unit)	95.88	287,651	211.11	633,333
	Total Cost of Production Facilities	(IDR)		386,488		850,947
	b. Labor:					
	TKDK	(HKO)	14.34		31.57	
	TKLK	(HKO)	21.28		46.85	
	Total Kindergarten	(HKO)	35.62		78.42	
	Total Kindergarten Fees	(IDR)		3,683,817		8,110,811
	Total Variable Costs	**(IDR)**		**4,070,306**		**8,961,758**
2	Fixed Costs					

	a. Equipment Depreciation	(IDR)		289,793		638,049
	b. Land Lease	(IDR)		360,407		793,523
	Total Fixed Costs	**(IDR)**		**650,200**		**1,431,572**
3	Total Production Cost	(IDR)		4,720,505		10,393,330

Source: Primary Data, Processed in 2025

Based on Table 2, it shows that the average production costs incurred in the people's salt industry in Bima Regency in 2025 were IDR 4,720,505 /LLG and IDR 10,393,330 /ha consisting of variable costs of IDR 4,070,306 /LLG and IDR 8,961,758 /ha, and fixed costs of IDR 650,200 /LLG and IDR 1,431,572 /ha. The largest component of production costs is variable costs, accounting for 86.23%. Of the total variable costs, the highest is labour costs at IDR 3,683,817/LLG and IDR 8,110,811/ha (90.50%). The type of activity with the largest expenditure is on land clearing and compaction amounting to IDR 1,055,814/LLG and IDR 2,324,629/ha (28.66%) of the total labour costs, the second largest activity component is on pond drying amounting to IDR 1,027,907/LLG and IDR 2,263,185/ha (27.90%) of the total labour costs, the third largest activity component is on harvesting amounting to IDR 616,279/LLG and IDR 1,356,887/ha (16.73%) and the smallest activity component is on maintenance amounting to IDR 47,841/LLG and IDR 105,332/ha (1.30%). Followed by the average cost of purchasing sacks of IDR 287,651/LLG and IDR 633,333/ha (7.07%), and fuel costs in the form of pertalite and oil of IDR 98,884/LLG and 217,614/ha (2.43%).

Benefits of the People's Salt Industry in Bima Regency

Profits in the salt industry is the difference between total revenue and production costs, reflecting the income received by salt farmers. Details of production volume, selling price, revenue, production costs, profits, and the B/C value of the artisanal salt industry in Bima Regency are presented in Table 3 below:

Table 3. Average Profit of the People's Salt Industry in Bima Regency in 2025

No.	Description	Per LLG	Per Ha
1	Production (Kg)	4,817	10,607
2	Selling Price (IDR/Kg)	1,300	1,300
3	Revenue (IDR)	6,262,674	13,788,786
4	Production Cost (IDR)	4,720,505	10,393,330
5	Profit (IDR)	1,542,169	3,395,456
6	B/C	0.33	0.33

Source: Primary Data, processed in 2025

Based on Table 3, the average production of the smallholder salt industry in Bima Regency is 4,817 kg/LLG or 10,607 kg/ha/production process. With an average selling price at the farmer level of IDR 1,300/kg, the production/revenue value is IDR 6,262,674/LLG or IDR 13,788,786/ha. After subtracting the production cost of IDR 4,720,505/LLG or IDR 10,393,330/ha, the profit is IDR 1,542,169/LLG or IDR 3,395,456/ha/production process. The B/C value of the people's salt industry is 0.33 (B/C ≥ 0). This value shows that each unit of production costs IDR 100, yielding an additional profit of IDR 33. Thus, the people's salt industry in Bima Regency is worthy of development.

Policy Analysis Matrix Analysis

Private Fees

Private costs are calculated from actual market prices (farm-level prices prevailing at the time of production), reflecting the actual expenses farmers incur. Details are shown in Table 5 below:

Table 4. Average Benefit Cost of Private Salt Industry in Bima Regency in 2025

No.	Description	Unit	Amount	Price (IDR)	Domestic (IDR)	Foreign (IDR)	Total Value (IDR)
I	Cost				10,763,335	1,696,971	12,460,307
	***Tradable* Input**						
	Fuel						
	1. Pertalite	(Ltr)	7.68	10,000	-	76,800	76,800
	2. Oil	(Ltr/Bottle)	2.82	50,000	-	141,000	141,000
	Bag	(Unit)	211.11	3,000	633,333	-	633,333
	B. *Non-tradable Inputs*						
	Sea water	($m^{3)}$	-	-	-	-	-
	Labor	(HKO)	79.13	103,450	8,186,261	-	8,186,261
	Equipment Depreciation						
	1. Water Pump Machine	(Unit)	1	1,365,120	620,019	877,810	1,365,120
	2. Windmill	(Unit)	0.53	365,116	279,109	86,007	365,116
	3. Hoe	(Unit)	2.49	52,558	22,485	30,073	52,558
	4. Artco	(Unit)	1.14	530,930	206,633	324,298	530,930
	5. Shovel	(Unit)	2.28	161,047	47,295	113,751	161,047
	6. Rake	(Unit)	2.79	26,605	24,024	2,581	26,605
	7. Pipe	(Unit)	4.47	55,000	10,349	44,651	55,000
	8. Warehouse	(Unit)	1.02	373,421	373,421	-	373,421
	C. Other Costs						
	Land Lease	(Unit)	1	360,407	360,407	-	360,407

II	Reception						
	Salt Production	(Kg)	10,607	1,300			13,788,786
III	Profit	(IDR)					1,328,480
IV	(T/C)	(IDR)					0.11

Source: Primary Data, Processed in 2025

Table 4 shows that the private costs incurred by farmers amounted to IDR 12,460,307/ha, consisting of domestic (*non-tradable)* costs of IDR 10,763,335/ha and foreign (*tradable)*The B/C value of the folk salt industry is 0.11 (B/C ≥ 0), indicating that each use of production costs of IDR 100 results in an additional profit of IDR 11. Thus, the people's salt industry in Bima Regency is financially viable and has potential for further development, although profit levels remain relatively low due to price fluctuations and high production costs.

Social Costs

Social costs are costs calculated based on social prices *(shadow prices)*, namely prices that reflect the true value of resources without market distortion or government policy intervention, as can be seen in Table 5 below:

Table 5. Average Social Benefit Cost of the People's Salt Industry in Bima Regency in 2025

No.	Description	Unit	Amount	Price (IDR)	Domestic (IDR)	Foreign (IDR)	Total Value (IDR)
I	Cost				10,628,607	1,676,292	12,304,899
	A. Tradable Input						
	Fuel						
	1. Pertalite	(Ltr)	7.68	11,971	-	91,937	91,937
	2. Oil	(Ltr/Bottle)	2.82	37,299	-	105,183	105,183
	Bag	(Unit)	211.11	2,362	-	498,605	498,605
	B. Non-tradable Inputs						
	Sea water	($m^{3)}$	-	-	-	-	-
	Labor	(HKO)	79.13	103,450	8,186,261	-	8,186,261
	Equipment Depreciation						
	1. Water Pump Machine	(Unit)	1	1,365,120	620,019	877,810	1,365,120
	2. Windmill	(Unit)	0.53	365,116	279,109	86,007	365,116
	3. Hoe	(Unit)	2.49	52,558	22,485	30,073	52,558
	4. Artco	(Unit)	1.14	530,930	206,633	324,298	530,930
	5. Shovel	(Unit)	2.28	161,047	47,295	113,751	161,047

	6. Rake	(Unit)	2.79	26,605	24,024	2,581	26,605
	7. Pipe	(Unit)	4.47	55,000	10,349	44,651	55,000
	8. Warehouse	(Unit)	1.02	373,421	373,421	-	373,421
	C. Other Costs						
	Land Lease	(Unit)	1	360,407	360,407	-	360,407
II	Reception						
	Salt Production	(Kg)	10,607	1,739			18,445,154
III	Profit	(IDR)					6,140,255
IV	(T/C)	(IDR)					0.50

Source: Primary Data, Processed in 2025

Table 5 shows that the smallholder salt industry in Bima Regency has social costs borne by farmers of IDR 12,304,899/ha. These cost components consist of domestic (*non-tradable)* costs of IDR 10,628,607/ha and foreign (*tradable) costs of IDR 10,628,607/ha.*) amounting to IDR 1.676.292/ha. The average production of salt farmers is 10,607kg/ha, with a selling price of IDR 1,739/kg, yielding a revenue of IDR 18,445,154/ha. The difference between revenue and total social costs yields a social benefit of IDR 6,140,255/ha. The B/C value in social analysis is 0.50 (B/C ≥ 0). This value means that each use of production costs of IDR 100 provides an additional profit of IDR 50. Thus, the people's salt industry in Bima Regency is economically viable and can be further developed. This shows that, with policy distortions that burden farmers, farmers' profits are lower than the potential social benefits, even though they still make profits. Therefore, at the social price level, the people's salt industry has greater economic advantages than at the private price level, because it is not affected by market distortions or government policies that affect input and output prices.

Analysis of Private Profit and Social Profit

Private profits reflect the performance of the community salt industry system, influenced by technology use, output value, input costs, and government policies. Meanwhile, social profits reflect the efficiency of the production system under ideal market conditions free from various forms of price distortion and government intervention.

Table 6. Policy Analysis Matrix for the People's Salt Industry in Bima Regency in 2025

Description	Reception	Cost		Profit
		Tradable	*Non-Tradable*	
Private Price	13,788,786	1,696,971	10,763,335	1,328,480
Social Price	18,445,154	1,676,292	10,628,607	6,140,255
Policy Impact	- 4,656,367	20,680	134,728	- 4,811,775

Source: Primary Data, Processed in 2025

Table 6 shows that the smallholder salt industry in Bima Regency provides both private and social benefits, with private benefits totaling IDR 1,328,480/ha. This value is obtained by subtracting total costs from revenue at the private price level of IDR 13,788,786/ha. Total costs consist of tradable input costs of IDR 1,696,971/ha and

non-tradable input costs of IDR 10,763,335/ha. Meanwhile, social benefits of IDR 6,140,255/ha are obtained from revenue at the social price level of IDR 18,445,154/ha, minus *tradable* input costs of IDR 1,676,292/ha and *non-tradable input costs* of IDR 10,628,607/ha. Social benefits exceed private profits, indicating that the smallholder salt industry in Bima Regency earns profits above normal costs, both privately and socially. This indicates that the smallholder salt industry has potential for development (expansion).

However, the current policy had a negative impact of -4,811,775 Rupiah, indicating that it was detrimental because it provided a disincentive to smallholder salt farmers. However, from a social perspective, the smallholder salt industry can absorb labour, so it can be said to be detrimental to salt farmers.

Obstacles faced by smallholder salt farmers

Table 7. Obstacles faced by smallholder salt farmers in Bima Regency

No.	Constraint	Number of Farmers	Percentage (%)
1	Capital and Weather	3	6.98
2	Capital and Marketing	13	30.23
3	Unstable Weather, Quality and Selling Prices	10	23.26
4	Marketing and Selling Prices Are Unstable	17	39.53
	Amount	43	100

Source: Primary Data, Processed 2025

Table 7 shows that the main obstacles facing the smallholder salt industry in Bima Regency are marketing and unstable selling prices (39.53%), followed by limited capital and marketing (30.23%), and weather, quality, and price fluctuations (23.26%). The smallest obstacle is a combination of capital and weather (6.98%). These problems are triggered by limited market access, competition from imported salt, inconsistent product quality, low technology utilization, limited capital, and weather conditions that suppress productivity. Therefore, an integrated strategy is needed that includes increased market access, capital support, technology implementation, and quality control to strengthen the competitiveness of smallholder salt.

CONCLUSIONS AND SUGGESTIONS

Conclusions

Based on the results of the research and data analysis that have been carried out, the following conclusions can be drawn:

1. The social cost of the people's salt industry in Bima Regency is IDR 12,304,889/ha.

2. The private profit of the people's salt industry in Bima Regency is 1,328,480/ha while the social profit is IDR 6,140,355/ha. The value of the B/C ratio is 0.33 (B/C ≥ 0). Thus, the people's salt industry in Bima Regency is feasible to be developed economically and socially.

3. The main obstacles faced by the smallholder salt industry in Bima Regency are marketing and unstable selling prices (17 respondents, 39.53%), followed by capital and marketing constraints (13 respondents, 30.23%), and weather, quality, and unstable selling prices (10 respondents, 23.26%). Meanwhile, the smallest obstacles are capital and weather with 3 respondents (6.98%). This indicates that marketing is the biggest and most pressing problem to be addressed in developing the smallholder salt industry.

Suggestions

Based on the results of the research and data analysis that have been carried out, the following suggestions can be written:

1. Smallholder salt farmers are expected to improve production quality through pond rehabilitation and modernization, the use of simple, efficient technology, and salt technology training. These steps are expected to increase the productivity and quality of small-holder salt, making it more competitive with imported salt.

2. The government is expected to encourage the establishment of a salt factory in Bima Regency to maintain price stability, open wider market access, and create jobs for the community.

3. Regional governments are advised to strengthen the economic livelihoods of salt farmers by supporting farmer groups through the provision of production facilities, expanded access to capital, and training in value-added salt processing to increase product competitiveness and farmer welfare.

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