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ANALYSIS OF INPUT EFFICIENCY AND ECONOMIES OF SCALE IN SALT PRODUCTION IN BULELENG REGENCY

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Abstract: Indonesia, widely recognized as a maritime country with vast marine potential, has yet to achieve salt self-sufficiency despite its favorable geographical conditions. This study aims to analyze the efficiency of input utilization and economies of scale in salt production in Buleleng Regency, one of the main salt-producing regions in Bali Province. A quantitative approach using an associative method and the Cobb-Douglas production function model was employed to examine the influence of capital, labor, land area, and technology on salt production. The sample consisted of 126 traditional salt farmers selected using proportionate stratified random sampling. The results indicate that all input variables—capital, labor, land area, and technology—have a positive and significant effect on production, both partially and simultaneously. Salt production in Buleleng exhibits increasing returns to scale, suggesting potential for output expansion if inputs are optimized. The efficiency analysis reveals that capital, land area, and geomembrane technology are not yet utilized optimally (Ef > 1), while labor is used excessively (Ef < 1). Additionally, the production process is highly dependent on weather conditions, as all salt farmers can only operate during the dry season. These findings underscore the importance of improving access to technology and enhancing input management efficiency to support increased productivity and national salt self-sufficiency.

Keywords: salt production, input efficiency, economies of scale, Cobb-Douglas, Buleleng, traditional salt farming

INTRODUCTION

Indonesia remains one of the largest salt importers in Asia, despite its immense potential as a maritime nation with an extensive coastline. In 2023, the country imported 2.807 million tons of salt, up from 2.756 million tons the previous year. This reflects a high dependence on imported salt, even though Indonesia's geographical and climatic conditions theoretically provide the capacity to achieve self-sufficiency (BPS, 2024; Jamil et al., 2017). To address this issue, the government has designated salt as one of 26 priority commodities for downstream industrialization within the national development agenda, aimed at boosting production through investment and modernization in the salt sector (Tirta, 2024).

However, national salt production between 2015 and 2023 exhibited a fluctuating trend. Extreme weather events—such as the La Niña phenomenon in 2016—led to a drastic decline in output, dropping to only 0.168 million tons. Conversely, 2015 and 2023 recorded the highest production levels, at 2.9 and 2.5 million tons respectively. These fluctuations are driven not only by climate variability but also by inefficient, traditional production methods and limited availability of salt ponds (BMKG, 2021; Mangeswuri & Ramadhan, 2024). Although production in 2023 exceeded the national target of 1.7 million tons, it remains insufficient to meet industrial demand, which is estimated at 4–5 million tons annually (KKP, 2023).

Salt consumption in Indonesia comprises two major categories: household and industrial salt. The average per capita consumption is estimated at 8.5 grams per day, which surpasses the World Health Organization's recommendation of 5 grams. Most of this intake stems from processed foods such as instant noodles, salted fish, and seasonings, positioning the food industry as the largest consumer of salt nationwide (Direktorat Industri Kimia Hulu, 2023). To fulfill this demand, Indonesia hosts approximately 400 salt processing facilities, with 13 large and 56 medium-scale factories accounting for about 70% of total processing capacity. Many of these facilities also rely on imported raw salt due to perceived inconsistencies in the quality of local salt.

National salt production is geographically concentrated in several coastal regions. Madura Island is the traditional salt production hub, followed by coastal areas in Cirebon, Pati, East Nusa Tenggara, and parts of Sulawesi. The Indonesian government aims to eliminate salt imports for consumption by 2025 and achieve full self-sufficiency for industrial salt by 2027, as outlined in Presidential Regulation No. 126 of 2022 concerning the Acceleration of National Salt Development (Perpres No. 126, 2022). This regulation supports infrastructure enhancement, technological modernization, and the empowerment of local salt farmers, in line with Law No. 7 of 2016 and Law No. 3 of 2014 on Industry, which emphasize the development of strategic industries based on local resources (UU No. 7/2016; UU No. 3/2014).

Bali is one of the regions with strong potential for developing high-quality salt. Areas such as Amed, Kusamba, and Tejakula are renowned for producing natural, chemical-free salt using traditional methods. This includes pyramid-shaped organic salt, which holds high export value (Kemenko Marves, 2021; Antaranews, 2023). Buleleng Regency, with Bali's longest coastline—157.05 km—serves as a primary salt-producing center. The provincial government of Bali actively supports the protection and promotion of traditional salt through geographic indication schemes to enhance its competitiveness in both national and international markets (BRIDA Jembrana, 2022; Bali Post, 2021).

Table 1. Shows Salt Production Based on Regency or City in Bali Province for the Period 2014-2018.

Regency/City	**Salt Production Amount (Kg)**								
	2015	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Klungkung	92	123	9	12	68	20	29,707	28,730	42,984
Buleleng	**9,828**	**8,672**	**4,548**	**6.240**	**3.430**	**2,705**	**947,789**	**1,363,705**	**2,866,538**
Jembrana	14	2	-	-	-	-	-	-	-
Karangasem	1,439	977	382	1.172	538	319	364,819	138,964	350,328
Tabanan	2	3	-	3	3	3	-	-	-
Bangli	-	-	-	-	-	-	-	-	-
Badung	12	240	-	-	-	-	-	-	-
Gianyar	600	88	85	72	-	-	-	-	-
Denpasar	-	-	-	-	-	-	-	-	-

Total (Tons)	11,554	10,790	4.957	7,427	4.039	3,047	1,342	1,531.4	3.260

Source: Bali Provincial Marine and Fisheries Service, 2024

Salt production in Buleleng decreased in 2019–2021, with production reaching its lowest point in 2021 (947,789 kg). However, there was a significant recovery in 2022 and 2023. This trend shows the sensitivity of salt production to external factors such as weather conditions and technology. The data shows that Buleleng is the main contributor to salt production in Bali, with production figures dominating compared to other regencies. In 2023, Buleleng contributed 2,866,538 kg, which covered more than 80% of the total salt production in Bali. The fluctuation of production from 947,789 kg in 2021 to a drastic increase in 2023 shows that there are variables that significantly affect salt production output.

Although Bali has a very wide coastline, and has the potential to be developed as a salt producing area. However, the profession of salt farmers is still less in demand by the community (Department of Marine Affairs and Fisheries, 2017). The following is data related to the number of salt farmers in Bali Province:

Table 2. Number of Salt Farmers in Bali Province in 2023

No	Regency/City	Number of Salt Farmers (People)
1	Tabanan	0
2	Jembrana	4
3	**Buleleng**	**183**
4	Denpasar	11
5	Badung	0
6	The city of Klungkung	23
7	Gianyar	8
8	Karangasem	240
Amount		**469**

Source: Processed Data, Bali Province Fisheries and Marine Service, 2024

Based on Table 2, there were 469 salt farmers in Bali Province in 2017, distributed across several regencies/cities. However, the distribution reveals a notable concentration in specific areas. Karangasem Regency recorded the highest number of salt farmers (240), followed by Buleleng Regency with 183, meaning over 90% of Bali's salt farmers are concentrated in these two regions. The dominance of Buleleng as a salt production hub highlights its substantial coastal natural resource potential in supporting salt farming activities (Dinas Perikanan dan Kelautan Provinsi Bali, 2024).

Weather conditions have a significant impact on salt production. Unpredictable climate patterns lead to unstable production volumes and inconsistent salt quality. According to the Meteorology, Climatology, and Geophysics Agency (BMKG), climate change in recent years has intensified weather variability across Indonesia, including in Buleleng (BMKG, 2020). This adds uncertainty for salt farmers in planning production and managing risk. Technological adoption in salt production remains relatively low in many regions, including Buleleng, despite its potential to improve both productivity and quality. A study by Susanto (2021) found that implementing technologies such as mechanical drying and salinity monitoring sensors can increase output by up to 30%. However, limited access to capital and technical knowledge hinders widespread adoption.

Production methods also play a crucial role in determining salt output in Buleleng. Traditional methods are still widely used and tend to be less efficient compared to modern techniques. Prasetyo (2020) emphasized that while modern methods can improve both quantity and quality of salt produced, successful adoption requires training and continuous guidance for farmers. Therefore, the effectiveness of technological intervention must be coupled with capacity-building programs tailored to local needs.

Scholars stress the importance of government and institutional support to address the challenges faced by salt farmers. Enhancing access to capital, technology, and real-time weather information can improve production efficiency and resilience (Sudaryanto, 2018). Training and mentorship programs are also critical to ensure farmers can adopt and utilize modern production methods effectively. This study, therefore, seeks to identify the key factors influencing salt farming success in Buleleng and propose appropriate solutions to overcome existing barriers. The research aims to contribute positively to the welfare of local salt farmers and the development of Bali's salt industry.

Although several studies have explored salt production in Indonesia—particularly focusing on capital, land area, and technology—few have specifically addressed Buleleng Regency, despite its large potential and unique challenges. Efficiency in input use is a key factor in increasing production. Economic efficiency is achieved when resources are optimally allocated to maximize output at minimum cost, without waste or misallocation (Aziza, Prasetyo & Setiadi, 2022). According to Soekartawi (2010), efficiency occurs when the marginal product of an input equals its cost. In this context, salt farmers must ensure optimal input use to achieve maximum production efficiency. Additionally, Sukirno (2010) emphasizes that capital, labor, raw materials, and technology are major production factors, while in the Buleleng context, capital, labor, land area, technology, and weather conditions are the most influential.

METHOD

This study applies a quantitative approach using an associative method to analyze the effects of capital, labor, land area, and technology on salt production in Buleleng Regency. The region was selected due to its favorable geographic and socio-economic characteristics—such as a long coastline, tropical climate, flat topography, and strong traditional salt production practices. The research subjects were salt farmers, while the objects of analysis included five main variables: capital, labor, land area, technology, and production. A sample of 126 respondents was drawn from the total population of 183 salt farmers using proportionate stratified random sampling.

Data used consisted of primary data obtained through questionnaires and interviews, and secondary data from government agencies and scholarly sources. Data collection techniques included structured observation, structured interviews, and in-depth interviews to gather detailed information about each variable. Independent variables included capital (X1), labor (X2), land area (X3), and technology (X4), while the dependent variable was salt production (Y). Technology was measured using a dummy variable based on the use of geomembranes in the production process, indicating adoption of modern methods aimed at improving efficiency and quality.

The data were analyzed using multiple linear regression with a Cobb-Douglas production function model, which was transformed into a natural logarithmic form to quantitatively assess the influence of each variable. Statistical tests included descriptive statistics and classical assumption tests such as normality, multicollinearity, and heteroscedasticity to validate the model. The regression results are expected to provide empirical insight into the productivity determinants of salt farmers and inform policy recommendations aimed at enhancing farmer welfare through improved technology and resource management.

RESULTS AND DISCUSSION

Descriptive Statistical Analysis

Table 3. Results of Descriptive Statistical Tests

	N	Min	Max	Mean	Std. Dev.
Capital (X1)	126	13.75	16.71	15.1954	.69656
Labor (X2)	126	.00	2.71	1.2877	.68824
Land Area (X3	126	.69	4.58	3.0556	1.18064
1=Using Geomembrane, 0=Not Using Geomembrane	126	0	1	.58	.496
Production (Y)	126	5.56	9.66	7.8546	1.10580

Source: Primary Data (2025)

Based on the results of the descriptive statistical analysis in table 4.8, it can be explained that the average capital outlay by salt farmers is 15,20 (in log units), this shows the variation between salt farmers with small to large capital. The average workforce used is 1.29 people, with a minimum value of 0, this shows that there are farmers who work alone without the help of additional workers.

The average area of land cultivated by salt farmers is around 3 hectares.,06 are, with quite wide land variations between farmers. As many as 58% of farmers have used geomembrane technology, indicating the increasing adaptation of modern technology. Meanwhile, the average salt production per season is 7.85 (in logs), with variations in production obtained by other production factors.

Multiple Linear Regression

$Ln\hat{Y} = \alpha + \beta 1LnX_1 + \beta 2LnX_2 + \beta 3LnX_3 + \delta 4X_4$

$Ln\hat{Y} = 3.338 + 0.092LnX_1 + 0.068LnX_2 + 0.925LnX_3 + 0.345X_4$

SE = (0.040) (0.029) (0.031) (0.039)

T_{count} = (2.292) (2.346) (30.170) (8.783)

Sig = (0.000) (0.024) (0.021) (0.000) (0.000)

Source: Primary Data (2025)

From this equation, we get the following results:

1) InterceptY = 3.338If all input variables (capital, labor, land area and technology) have a value of zero (on a logarithmic scale), then the basic value of the production log is predicted to be 3,338.
2) Coefficient X1 = 0.092 means that if capital increases by 1%, production will increase by 0.092%.
3) The coefficient X2 = 0.068 means that if the workforce increases by 1%, production will increase by 0.068%.
4) Coefficient X3 = 0.925 means that if the land area increases by 1%, production will increase by 0.925%.
5) The coefficient X4 = 0.039 means that if technology increases by 1%, production will increase by 0.039%.

The R^2 value is 0.978The coefficient of determination (R^2) value of 0.978 indicates that 97.8% of the variation in salt production can be explained by the variables of capital, labor, land area, and the use of geomembrane technology. This shows that the model used in this study is very good at explaining the factors that influence salt production in Buleleng Regency, while the remaining 2.2% is explained by other factors outside the model.

Classical Assumption Test (normality test, multicollinearity test, heteroscedasticity test)

1) **Normality Test**

Table 4. Normality Test with One Sample Kolmogorov-Smirnov Test Statistic

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		126
Normal Parametersa,b	Mean	.0000000
	Std. Deviation	.16470728
Most Extreme Differences	Absolute	.076
	Positive	.076
	Negative	-.042
Test Statistics		.076
Asymp. Sig. (2-tailed)		.074c

a. Test distribution is Normal.
b. Calculated from data.

Source: Primary Data (2025)

Based on the results of the normality test using the One-Sample Kolmogorov-Smirnov Test, a significance value of 0.074 was obtained. Because the significance value is greater than 0.05, it can be concluded that the residual data in this study is normally distributed. Thus, the regression model meets the normality assumptions required in regression analysis.

2) **Multicollinearity Test**

Table 5. Multicollinearity Test Results

Variables	Colinearity Tolerance	VIF Statistics
Capital (X1)	0.284	3,515
Labor (X2)	0.557	1,797
Land Area (X3)	0.171	5,840
Technology (X4)	0.592	1,690

Source: Primary Data (2025)

Based on the results of the multicollinearity test in Table 5, all independent variables in the model have a tolerance value above 0.1 and a Variance Inflation Factor (VIF) value below 10. This shows that there is no multicollinearity in the regression model, so there is no high correlation between independent variables that can affect the accuracy of the model estimation.

3) **Heteroscedasticity Test**

Table 6. Results of Heteroscedasticity Test (Glejzer Test)

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig
	B	Std. Error			
(Constant)	-0.056	0.335		-0.167	0.868
LnX1	0.018	0.025	0.122	0.732	0.466
LnX2	-0.020	0.018	-0.132	-1.113	0.268
LnX3	-0.20	0.019	-0.224	-1.043	0.299
1= Using Geomembrane, 0= Not Using Geomembrane	-0.016	0.024	-0.074	-0.644	0.521

a. Dependent Variable: ABS_RES

Source: Research Data (2025)

Based on the results of the heteroscedasticity test using the Glejser method, it was obtained that all independent variables have a significance value > 0.05. This indicates that there are no symptoms of heteroscedasticity in the model, so that the residual variance can be said to be homogeneous (homoscedasticity). Thus, the classical assumption of heteroscedasticity in regression analysis is met.

Simultaneous Regression Coefficient Test

a. Determining Hypothesis

H0: = = = =0$\beta_1\beta_1\beta_1\beta_1$	This means that capital, labor, land area and technology do not affect the level of salt production in Buleleng Regency.
: minimum one $H_i\beta_1 \neq 0$ (i = 1,2,3,4,5)	This means that capital, labor, land area and technology simultaneously influence the level of salt production in Buleleng Regency.

b. The real traf (α) is 5% or a confidence level of 95% with degrees of freedom df = (k – 1); (n – k), then Ftable = F (α), (k-1), (nk).
   $\alpha = 5\%$; df = (k-1) (nk)
   Ftable = F 0.05; (5-1) (126-5)
   = F0.05; 4; 121
   =2.45
c. Testing criteria
   At a significance level of 5%, the testing criteria used are as follows:
   If Fcount ≤ Ftable, then H0 is accepted and H1 is rejected.
   If Fcount > Ftable, then H0 is rejected and H1 is accepted.
d. Conclusion

The results of the simultaneous significance test through the F test show that the F count value of 1333.252 is greater than the F table of 2.45 at a significance level of 5%. Thus, H0 is rejected and H1 is accepted. This indicates that simultaneously the independent variables consisting of capital (X1), labor (X2), land area (X3), and technology (X4) have a significant influence on the dependent variable, namely salt production in Buleleng Regency. Therefore, the regression model built in this study can be used to explain the variation in changes in salt production influenced by the four variables together.

Partial Beta Regression Coefficient Significance Test (t-Test)

1) **The Influence of Capital (X1) on Salt Production**

The test results show that the t-value of 2.292 is greater than the t-table of 1.97976 (2.292 > 1.97976). In addition, the significance value for the capital variable is 0.024, smaller than the significance level of 0.05. This shows that capital has a significant positive effect partially on salt production. This means that the greater the capital spent, either for the procurement of equipment, additional raw materials, or other operational costs, the greater the volume of salt production. Adequate capital allows farmers to use production inputs optimally, including the ability to adopt modern technology.

2) **The Influence of Labor (X2) on Salt Production**

In the labor variable, the t-count value is 2.346 which is also greater than the t-table of 1.97976 (2.346 > 1.97976), with a significance value of 0.021 < 0.05. This indicates that partially the labor force has a significant positive influence on salt production. Sufficient labor, both in terms of quantity and skills, plays an important role in optimizing all stages of the production process, starting from land preparation, management of troughs or geomembranes, drying, to collecting salt results. The greater the labor force involved, the productivity produced also tends to increase.

3) **The Influence of Land Area (X3) on Salt Production**

The results of the t-test on the land area variable show that the calculated t value is 30.170, far exceeding the t table of 1.97976 (30.170 > 1.97976), with a significance level of 0.000 < 0.05. Thus, it can be concluded that partially the land area has a very positive and significant effect on salt production. The wider the land area managed, the greater the production capacity that can be produced, because the land area directly determines the area of seawater evaporation to produce salt crystals.

4) **The Influence of Geomembrane Technology (X4) on Salt Production**

Geomembrane technology variables show t-test results with a calculated t value of 8.783, which is greater than the t table of 1.97976 (8.783 > 1.97976), and a significance value of 0.000 < 0.05. This indicates that partially the use of geomembrane technology has a significant positive effect on salt production. The use of geomembranes has been shown to increase production efficiency by accelerating the evaporation process, minimizing contamination of dirt from the soil, and producing better salt quality and higher volume compared to traditional methods.

5) **t-Test Conclusion**

Based on the results of partial significance testing, all independent variables tested in the model, namely capital (X1), labor (X2), land area (X3), and geomembrane technology (X4), each proved to have a significant positive effect partially on salt production in Buleleng Regency. Thus, all production factors used in this study have an important role in determining the level of salt production, both quantitatively and qualitatively.

Descriptive Analysis of the Influence of Weather Conditions on Salt Production

Table 7. Distribution of Respondents Based on Weather Conditions During Salt Production in Buleleng Regency.

Weather Conditions During Production	Frequency	Percentage
Dry season	126	100%
Rainy season	0	0%
Total	126	100%

Source: Research Data (2025)

Based on the questionnaire data as presented in Table 4.12, it is known that all respondents (100%) stated that salt production activities were carried out entirely during the dry season. None of the respondents carried out production during the rainy season.

These results indicate that the sustainability of salt production in Buleleng Regency is entirely dependent on sunny weather conditions that predominantly occur during the dry season. Key factors that enable production during the dry season are high air temperature, minimal rainfall, and optimal sunlight intensity, all of which play a role in accelerating the evaporation process of seawater into salt crystals. Conversely, during the rainy season, high rainfall causes waterlogging in production areas, accompanied by high humidity and reduced exposure to sunlight, so that the evaporation process is disrupted and production cannot be carried out.

This complete dependence on sunny weather conditions shows that the salt production system in Buleleng is still very sensitive to changes in climate patterns and weather instability. This also reflects the vulnerability of the salt production system to external disturbances that are seasonal in nature or due to global climate phenomena. The results of in-depth interviews also strengthen this finding. A farmer said: "We can only produce when the sun is really hot. When the rainy season comes, there is no more production because the land is flooded with rainwater."(Interview, Farmer 3, Buleleng, 2025).

Likewise, another farmer added: "Although sometimes it is dry, but if the weather is often cloudy or there is local rain, our production results can decrease drastically. So it really depends on full sunny weather."(Interview with Fish Farmer, Tejakula, 2025).

Based on the results of this analysis, it can be concluded that weather factors are the dominant variables that greatly determine the success of salt production. Therefore, the development of a salt production system that is more adaptive to weather uncertainty, such as the application of geomembrane technology, effective land drainage management, and innovation in harvest management based on weather forecasts, is important to increase the resilience of the salt business in Buleleng Regency.

Economies of Scale Analysis

This study uses the Cobb-Douglas production function approach to analyze the relationship between salt production (output) and production factors (input), namely capital (X1), labor (X2), land area (X3), and technology variables (X4). The regression model estimation is carried out using the natural logarithm method (double log), which is commonly used in production analysis because it allows direct measurement of the elasticity of each input. The results of the model estimation produce the following equation:

$$Ln\widehat{Y} = 3.338 + 0.092LnX_1 + 0.068LnX_2 + 0.925LnX_3 + 0.345X_4$$

In the framework of the Cobb-Douglas model, the sum of the elasticity coefficientsinputproduction reflects the returns to scale of the production process being analyzed. Thus the accumulated elasticity of production factors is:

$$\sum \beta = \beta_1 + \beta_2 + \beta_3 + \delta = 0.092 + 0.068 + 0.925 + 0.345 = 1{,}430$$

Meanwhile, if we only take into account production factors without taking into account technology variables as a dummy, we obtain:

$$\sum \beta = \beta_1 + \beta_2 + \beta_3 = 0.092 + 0.068 + 0.925 = 1.085$$

The results of the elasticity summation show that the total value of the elasticity of production factors is above 1 ($\beta1 + \beta2 + \beta3 > 1$), which is 1.085, and if including the influence of technology it becomes 1.430. This indicates that the salt production business in Buleleng Regency is generally in a condition of increasing returns to scale or increasing returns. In other words, if all production factors (capital, labor, land area, and application of technology) are increased proportionally, then the increase in salt production produced will be greater than the increase in production factors.

Analysis of Efficiency of Use of Production Factors

Table 8. Coefficient Value, Average Production Amount, Average Salt Price (Kg), Average Production Input and Production Input Price of Each Production Input

InputProduction	Coefficient	Average Production Quantity	Average Salt Price (Kg)	Average Production Input	Production Input Prices
Capital	0.092	4035.48	6,250	4,897,810	244,890
Labor	0.068	4035.48	6,250	4.46	1,000,000
Land area	0.925	4035.48	6,250	34.46	200,000
Technology	0.345	4035.48	6,250	-	180,000

Source: Primary Data (2025)

Based on the data in Table 8, the efficiency level was calculated using formulas 3.9, 3.10, 3.11, and 3.12, with the following results:

$$Efx_1 = 0{,}092 \frac{(4035{,}48)\ (6.250)}{(4.897.000)\ (0{,}02)} = 23{,}69$$

$$Efx_2 = 0{,}068 \frac{(4035{,}48)\ (6.250)}{(4{,}46)(1.000.000)} = 0{,}38$$

$$Efx_3 = 0{,}925 \frac{(4035{,}48)(6.250)}{(34{,}46)(200.000)} = 3{,}38$$

$$Efx_4 = 0{,}345 \frac{(4035{,}48)(6.250)}{(180.000)} = 48{,}34$$

The results of the efficiency analysis of production inputs in salt farming show varying effectiveness levels across input factors. Specifically, the efficiency value for capital (X1) is 23.69, labor (X2) is 0.38, land area (X3) is 3.38, and the use of geomembrane technology (X4) is 48.34.

The capital efficiency score of 23.69 indicates that capital is not yet used efficiently and suggests that additional capital is needed to optimize salt production. Likewise, the land area and technology efficiency scores (Ef > 1) imply underutilization. These inputs require further enhancement to increase productivity.

In contrast, the labor efficiency score is 0.38, which is less than 1. This suggests that labor is being used excessively. To improve production efficiency, labor utilization must be optimized to avoid unnecessary resource and cost waste.

Overall, the analysis reveals that most production inputs capital, land, and geomembrane technology are underutilized and require increased deployment. Meanwhile, labor is the only input that needs to be reduced to achieve optimal salt production efficiency in Buleleng Regency.

CONCLUSION

1. Capital, labor, land area, and technology each have a significant positive partial effect on salt production in Buleleng Regency.
2. Simultaneously, these four inputs collectively have a significant positive influence on salt production.
3. The production scale of salt farming in Buleleng operates under increasing returns to scale, indicating that increasing input use will lead to a more than proportional increase in output.
4. Efficiency analysis shows that most inputs capital, land area, and geomembrane technology are not yet optimally utilized (Ef > 1), implying the need to increase their usage. Conversely, labor is overutilized (Ef < 1), suggesting it should be more efficiently.
5. Based on descriptive analysis, weather conditions significantly affect salt production, with all respondents reporting that salt production is only feasible during the dry season and halts during the rainy season. This reflects a high dependency on climate conditions in traditional salt production systems.

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