

# Analysis of Factors Affecting Production Level of Salt Farmers in Babalan Village, Demak Regency

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**ABSTRACT**

The purpose of this study was to determine the effect of capital, labor, land area, tenure on the production level of salt farmers in Babalan Village, Demak Regency. This study used Cobb-Douglas multiple linear regression analysis with the Ordinary Least Square (OLS) approach to examine primary data of 40 salt farmers who were randomly selected. The results of this study indicate that based on the results of regression analysis using Ordinary Least Square (OLS) and the validity test of the effect on the significance ( $\alpha$ ) of (0.01), the capital and labor variables had a significant positive effect on the Production Level of Salt Farmers while the variable land area and tenure had a significant negative effect on the Production Level of Salt Farmers. This research is the first study to investigate the effect of capital, labor, land area, and tenure on the production level of salt farmers in Babalan Village, Demak Regency.

**Keywords:** Salt Production, Capital, Labor

**1. INTRODUCTION**

Salt is one of the agricultural commodities that have the potential to be developed since the demand for salt continues to increase. National salt uses, among others, the Chlor Alkali Plant (CAP) which includes the petrochemical, pulp and paper, pharmaceutical and cosmetic industries, oil drilling, various foods, and household consumption. Salt as one of the marine commodities has an important role in daily life and industrial sector. The need for national salt increased over the year in line with the growing population and industrial development in Indonesia in 2000. The need for salt in Indonesia in 2021 was projected to reach 4.6

million tons, most of which (84%) is the need for the manufacturing industry of the total 4.6 million tons of national salt demand, 2.4 million tons or 53% is needed for the Chlor Alkali Plant (CAP) sector, which engages the petrochemical, pulp and paper industry [1].

Industrial growth in Indonesia has also resulted in the propensity of national salt that increases every year. The need for industrial salt always surges by 5%-7% yearly. Based on the national salt balance, the national demand in 2020 obtained that the total need for salt in Indonesia reached 4,464,670 tons, with industrial needs exceeding 83.86 percent or 3.74 million tons [1].

**Table 1.1** Salt Needs in Indonesia (Statistics Indonesia, 2020)

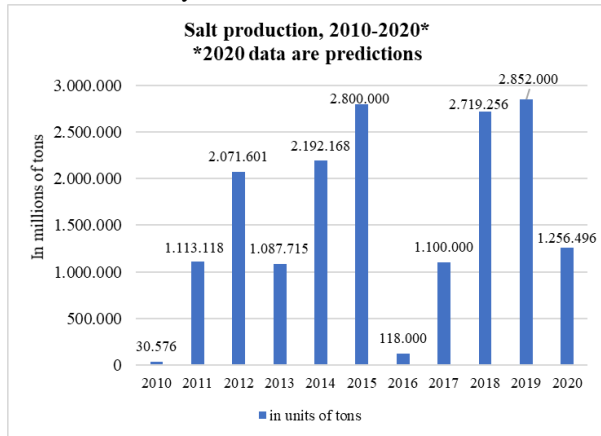
No	Details	2016	2017	2018	2019	Estimation 2020
1	Manufacturing industry	2.881.299	3.088.007	3.339.437	3.466.819	3.744.655
2	Household	307.595	310.076	313.775	317.634	321.541
3	Commercial	326.546	313.077	339.739	358.085	377.422
4	Ranch & plantation	17.448	18.175	18.932	19.964	21.052
<b>Total in tons</b>		<b>3.532.887</b>	<b>3.729.334</b>	<b>4.011.883</b>	<b>4.162.502</b>	<b>4.464.670</b>

Source: Statistics Indonesia (2020)

Indonesia is a salt producing country which regularly harvests salt every year. Although relying on imports to meet the needs, Indonesia is currently making effort to gradually reduce it by improving the community salt production in several areas known as Indonesian salt production centers.

**Graph 1.1** Indonesian Salt Production in 2010-2020

Source : Ministry of Maritime Affairs and Fisheries



(2020)

Based on data from the Ministry of Maritime Affairs and Fisheries (KKP), salt production in 2020 was predicted to reach 1.3 million tons. This number decreased significantly, which was 55.94 percent compared to the previous year. Meanwhile, the national demand for salt for both industry and consumption passed 4 million tons. Salt production from 2010 to 2020 continued to fluctuate. In 2016, salt production fell to 118 thousand tons, while in 2015 salt production grew 2.8 million tons [2].

Several factors can affect the Production Level of Salt Farmers, such as capital and labor. In this study, the factors that are expected to affect the Production Level of Salt Farmers are Capital, Labor, Land Area, and Tenure.

Many regions in Indonesia donate their salt production to the state, especially in Central Java Province. In 2019, the total salt production in Central Java attained 1.043 million tons. Babalan Village is one of the villages in Wedung District, Demak Regency, Central Java Province, which is an area known as the salt center of Indonesia. The potential for salt in Demak is also abundant, with approximately 1,354 salt farmers working around 1,388 hectares of productive salt pan. [3]. Given this description, this study aimed to measure and explain the influence of microeconomic variables such as capital, labor, land area, and tenure on the Production Level of Salt Farmers in the Village.

The results of research conducted by (Suryati et al, 2016) [4] with the title Factors Affecting Salt Production in Matang Tunong Village with a quantitative approach

research method obtained the results that the determination value ( $R^2$ ) was 0.919, meaning 91.9% of land area, salt seeds, and labor could explain variations in salt production, while the rest 9.59% were explained by other variables outside the model.

Research were also conducted by (Dolly Alfonso, 2014) [5] with the title Analysis of Efficiency in the Use of Salt Production Factors in Kaliore District, Rembang Regency with multiple linear analysis techniques. The results show that the land area variable had a significant influence on salt production in Kaliore District, Rembang Regency.

## 2. THEORETICAL BASE

### 2.1. Production Definition

Production can be defined as the process of converting inputs into outputs. Firms can convert inputs into outputs with various variations of labor, capital, and other production equipment [6]. Production is the end result of a process or economic activity utilizing several inputs or inputs. With this understanding, it can be determined that production activities are combining various inputs to produce outputs [7].

The production function is expressed in the form of a formula as follows:

$$Q = f(K, L, R, T)$$

Where K is the amount of capital stock, L is the number of workers and this includes various types of labor and entrepreneurial skills, R is natural wealth and T is the level of technology used. Q is the amount of product produced by these various types of production factors, which are used all together to produce the goods under the study for the nature of their production. The equation is a mathematical statement that basically denotes that the level of production of a good depends on the amount of capital, the amount of labor, the amount of natural wealth, and the level of technology used. Different amounts of production will naturally require the various factors of production in different amounts. In addition, for a certain level of production, a combination of different factors of production can also be used [8].

The form of Cobb Douglas production function is a production function that has an extreme isoquant form. This production function was first introduced by Cobb, C.W., and Douglas in 1928 through his article entitled "A Theory of Production" [7].

## **2.2 Definition of Capital**

Business capital or also known as investment is the cost incurred to purchase production equipment and capital goods which will be used in a production process to produce goods and services [9]. Capital is goods produced by the economic system used as inputs to produce other goods and services in the future [10]. The company's capital is a fixed cost. The larger the company's capital, the greater the opportunity is to enter the industry. To earn profits, the company will produce in large capacity [10].

The findings of research conducted by (Munzid, 2010) [11] show that capital production factors had an influence that is in the direction of production results; the more capital, the more the production results will be. In other research findings, capital had a positive and significant influence on the amount of production [11]. Furthermore, research conducted by (Sukayat, 2014) [11] show that capital had a significant effect on the production of lowland rice farming. The findings of research of (Chandra, 2013) [11] also imply that capital had a significant effect on production. Similarly, research findings from another research show that capital had a positive effect on production results [11].

## **2.3 Definition of Labor**

Workers are residents aged between 17 and 60 years working to earn money [12]. Meanwhile, the definition of labor according to (Hamzah, 2014) [12] is workers working inside and outside the employment relationship with the main means of production in the its process, both physically and mentally.

In the production process, the number of workers should be taken into account, not only in terms of the availability of labor but also the quality of the workforce as well as the type of workforce. This is in line with research findings that work experience had a great influence on completing a job that generally required more training [11].

According to the findings of research conducted by (Ng'ombe and Kalinda, 2015) [11], labor is the most influential factor on production results. This is not surprising given the labor input's greatest influence on any agricultural output. These results are consistent with research conducted by (Kabede, 2001) [11] that agricultural activities are traditional and labor-intensive economic activities, therefore the availability of labor determines the results of agricultural production. Studies on conservation farming practices in Zambia showed that conservation farming practices involved minimum land preparation and they required labor input for positive results [11]. The findings of research conducted by (Lis et al, 2012) [11] also found that the amount of wheat production in Henan Province was influenced by the labor used in the production process.

In other research findings, labor had a positive and significant effect on production [11]. Other research conducted by (Mahananto, 2009) [11] concluded that the number of workers had a very significant effect on increasing production. Research conducted by (Thamrin, 2013) and (Rinaldi, 2013) [11] also found the results that the labor production factor was a production factor that had a positive and significant effect on increasing production. Similarly, other research findings also found that labor production factors had a significant effect on production results [11].

## **2.4 Definition of Land Area**

Land is one of the most important production factors in the agricultural sector, where agricultural yields are greatly determined by the narrow area of land, the wider the land, the greater the agricultural yields obtained [11], according to (Rahim, 2007) [11], the larger the area of land used in the agricultural production process, the greater the amount of product produced. In an effort to increase agricultural productivity, farmers are increasingly dependent on the land availability. Assuming that there has been a lot of land conversion occurred in the agricultural sector which has been shifted into housing, hotels, restaurants, and others, efforts should be carried out to ensure that the land availability does not diminish for the sake of sustainable agricultural development [11].

The research findings show that land production factors had a significant influence on production [11]. Another study conducted by (Pamoriana, 2013) [11] also state that the coffee plantation area had a significant effect at the level of 10 percent on coffee farming production, meaning that if the coffee plantation area was wider, the amount of coffee production produced would increase. This is in line with the research findings that the wider the land used in the production process, the higher production yields will be [11]. Research conducted by (Ambarita, 2015) and (Sugiartiningsih, 2012) [11] found that land area had a significant and positive effect on production as well.

## **2.5 Definition Tenure**

Tenure is the length of time between doing an activity or the length of time someone has been employed [13]. Meanwhile, according to (Handoko, 2007) [13], tenure is a period or the length of time an employee has worked in a place.

Length of business or work is one of the variables that can affect production, in which the aspect of the experience for production activities, for example, the experience that has been acquired from the followed training. This corresponds to the research findings which suggest that a longer established business will make the skills possessed by each workforce to be equal. Thus, the

length of effort can be used to determine the level of loyalty of the industry to produce its production goods [14].

### 3. RESEARCH METHODS

#### 3.1 Approaches, Sources, and Research Data Collection Techniques

In this study, the authors used a quantitative research approach. Quantitative research method is a research method based on the philosophy of positivism, which is used to examine certain populations or samples. Data collection applied research instruments, while data analysis was quantitative or statistical to test the established hypothesis [15]. This study probed the effect of several variables such as Capital, Labor, Land Area, and Tenure on the Production Level of Salt Farmers in Babalan Village, Demak Regency.

Sources of data in this study used primary data. Primary data are data source that directly provides data to data collectors [16]. In this study, the number of samples taken consisted of 40 respondents from a total population of 468 salt farmers in Babalan Village, Wedung District, Demak Regency. The selection of respondents was carried out through purposive sampling method and by direct interview technique using a list of questions that had been prepared in advance and secondary data, namely data from the Statistics Indonesia, as well as literature studies from other relevant journals and books.

This study employed data collection techniques based on data collected by observing several aspect simultaneously, or without considering time differences (cross-section). This research was analyzed using Ordinary Least Square (OLS).

#### 3.2 Data analysis technique

This study used data on Capital, Labor, Land Area, and Tenure. Furthermore, data were collected and analyzed using the Cobb-Douglas multiple linear analysis technique. The Cobb-Douglas production function is a function or equation involving two or more variables, where one variable is called the dependent variable Y, and the other variable is called the independent variable X. Investigating the relationship between Y and X is usually done using regression, where the variation of Y will be affected by variations X. Cobb Douglass production function is formulated as follows [17]:

$$Y = \beta_1 X_2 X_3 e^u$$

Description:

Y = Output

X<sub>2</sub> = Labor Input

X<sub>3</sub> = Capital Input

u = Stochastic Disturbance Factor

e = Base of natural logarithm

Thus, for the data obtained to be analyzed using the Cobb-Douglas production function, they should first be transformed into a linear form using the natural logarithm (ln) which can be processed further using multiple linear regression analysis. Hence, the equation is as follows:

$$\text{LogTPPGt} = \beta_0 + \beta_1 \text{Log}(M_t) + \beta_2 \text{Log}(TK_t) + \beta_3 \text{Log}(LL_t) + \beta_4 \text{Log}(LB_t) + e_t$$

Description:

TPPG = Salt Farmer Production Rate

M = Capital

TK = Labor

LL = Surface Area

LB = Tenure

B<sub>0</sub> = Constant

B<sub>1</sub> β<sub>2</sub> β<sub>3</sub> β<sub>4</sub> = Regression Coefficient

Log = Natural logarithm operator

e = error/residual

## 4. RESULTS AND DISCUSSION

### 4.1 Estimated Results

In this study, to determine the effect of the variables Capital, Labor, Land Area, and Tenure on the Production Level of Salt Farmers used multiple linear regression analysis with the Ordinary Least Square (OLS) approach. The OLS model is a linear regression model with the least squares calculation method. In Table 1, the diagnostic test shows that the model violated the classical assumption test at all. The empirical probability values of the residual normality test, heteroscedasticity test, and linearity test were 0.01424 (> 0.01), 0.3311 (> 0.01), 0.2070 (> 0.01), respectively, indicating that the estimated model had a normal residual distribution and heteroscedasticity with exact model specifications (linear). The estimation results of the econometric model above and its complementary tests are summarized in Table 1.

**Table 1**  
**Econometric Model Estimation Results**

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$SFPR_t = -7,7578 + 0,6310 \log(C_t) + 0,3475 \log(LB_t) + 0,1043 \log(LA_t)$			
(0,0034)	(0,0044)**	(0,0768)***	(0,6089)
<hr/>			
$-0,0504 \log(LW_t)$			
(0,8923)			
<hr/>			
$R^2 = 0,6599; DW\text{-Stat.} = 1,3374; F\text{-Stat.} = 16,9793; Prob. F\text{-Stat.} = 0,0000$			
<hr/>			
Diagnostic Test			
(1) Multicollinearity (VIF)			
Log(SFPR) = 6,0960; C = 0,0428; LB = 0,0363; LA = 0,0408 ; LW = 0,1368			
(2) Residual Normality			
JB(2) = 3,8974; Prob. JB(2) = 0,1424			
(3) Heteroscedasticity			
$\chi^2(14) = 15,7143; Prob. \chi^2(14) = 0,3311$			
(4) Linearity			
F(2,33) = 1,6526; Prob. F(2,33) = 0,2070			

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**Source:** Primary Data, processed. Description :  $\alpha = 0,00^*$ ;  $\alpha = 0,01^{**}$ ;  $\alpha = 0,10^{***}$ . The number in brackets is the empirical probability (p value) t-statistic.

**5. DISCUSSION**

The Ordinary Least Square (OLS) Estimation Method shows that the Capital variable had a regression coefficient of 0.6310 with a prob. value t-statistic of  $0.0044 < 0.01$ , which means that the Capital variable had a positive and significant effect on the Production Level of Salt Farmers.

The empirical findings of this study are supported by research conducted by (Lestina, 2016) [18], with the research title Factors Affecting the Level of Salt Production in Jenepono Regency with the result that the Capital variable had a positive and significant effect on salt production in Jenepono Regency. This is reasonable since the significance value for salt production was  $< 0.05$ . Therefore, the hypothesis stating that capital has a positive and significant effect on salt production can be accepted. In that sense, when the capital is used to produce more salt for one harvest, the level of production for one harvest will also increase or grow.

The Ordinary Least Square (OLS) Estimation Method shows that the Labor variable had a regression coefficient of 0.3475 with a prob. value t statistic  $0.0768 < 0.10$ , meaning means that the Labor variable had a positive and

significant effect on the Production Level of Salt Farmers.

The empirical findings of this study are enforced by research conducted by (Ade Mauliza et al, 2016) [19] who also conducted a study with the title Factors Affecting People's Salt Production in Seunuddon District, North Aceh Regency with the results showing that the variables of Land Area, Salt Seed, Labor, and Firewood simultaneously had a very significant influence on salt production. Research conducted by (Nurmansyah, 2015) [20] with the research title Factors Affecting Salt Production PT. Garam Persero in Madura Island also had a positive and significant influence on the Labor variable on the salt production of PT. Garam Persero in Madura Island. In that sense, when the labor is used to produce more salt for one harvest, the level of production for one harvest will also increase or grow. Research conducted by (Eni Setyowati et al, 2009) [21] with the title Analysis of Organic Rice Production in Sragen Regency in 2008 obtained the results of the study that the variable Labor had a positive influence on organic rice production with a coefficient level of 0.371. In line with research conducted by (Didit Purnomo et al, 2019) [22] with the title Analysis of Rice Production in Indonesia and the results obtained that the labor variable had a significant

influence on rice production with a coefficient of determination ( $R^2$ ) of 0.998330.

The Ordinary Least Square (OLS) Estimation Method shows that the Land Area variable had a regression coefficient of 0.1043 with a prob value. t statistic of 0.6089, meaning that the variable of land area had a negative and insignificant effect on the production level of salt farmers.

The empirical findings of this study are supported by previous research (Suryati et al, 2016) [4] with the title Factors Affecting Salt Production in Matang Tunong Village that the variable land area had no significant effect on salt production in the research area because the significance value was greater than alpha ( $0.069 > 0.05$ ). The average land area in the study area was 0.0444. However, contrary to research conducted by (Irawan and Hasmarini, 2021) [23] with the title Analysis of Factors Affecting Coffee Production in Temanggung Regency, the results show that the variable land area had a positive and significant effect on Coffee Production in Temanggung Regency.

The Ordinary Least Square (OLS) Estimation Method shows that Tenure variable had a regression coefficient of -0.0504 with a prob. value t statistic of 0.8923, meaning that the variable tenure had a negative and insignificant effect on the production level of salt farmers.

The empirical findings of this study are supported by research conducted by (Lestina, 2016) [18], with the research title Factors Affecting the Level of Salt Production in Jeneponto Regency that tenure variable did not significantly affect salt production.

## 6. CONCLUSION

Based on the results of regression analysis using Ordinary Least Square (OLS) and the validity test of the effect on the significance ( $\alpha$ ) of (0.01), the variables of capital and labor had a significant positive effect on the Production Level of Salt Farmers, while the variables of land area and tenure had a significant negative effect on the Production Level of Salt Farmers.

This study provides suggestions to further increase salt production in Demak Regency and farmers are empowered to be more creative in managing salt production along with the times. The Government of Demak Regency, especially the Department of Agriculture, should further improve and streamline the expenditure budget, especially in the agricultural sector so it can prosper the farmers, especially salt farmers fairly in each sub-district in Demak Regency.

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## AUTHORS' CONTRIBUTIONS

The results of this study are expected to contribute as follows:

For academics, the benefits of this research are expected to add insight and scientific development of academics, especially those who are interested in researching the Level of Salt Production, take advantage of the results of this research analysis as a basis for making decisions regarding the research.

For the government, the benefits of this research are expected in addition to adding references, it can be considered to be a reference that leads to salt production in Indonesia in the future.

For future researchers, it is expected to be a reference material and additional empirical evidence about the factors that affect the Production Level of Salt Farmers.

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