The impact of season change to salt productivity in Pangenan Sub-district Cirebon Regency in 2013 and 2014

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The impact of season change to salt productivity in Pangenan Sub-district Cirebon Regency in 2013 and 2014

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Abstract. Salt as a commodity will always be needed by human as well as human need for food. Climatic conditions, less favorable weather changes are a natural factor that inhibits salt production. This study was conducted to analyze changes in salt productivity and salt farmer income due to seasonal changes in Pangenan Sub-district, Cirebon Regency as the largest salt producer in West Java. The variables of the research are seasonal conditions, salt production, salt pond area, salt productivity, selling price and salt farmer income, in 2013 and 2014. Variable data obtained from Fisheries and Maritime Office of Cirebon Regency, and the results of direct interviews with salt farmers then seen relation through statistical calculations using the Pearson Product Moment Correlation method. The result of the calculation shows the correlation value between the change of season and the productivity of 0.368 as r counting, r table of 0.320, and the significance of 0.023, and the value of income correlation with the number of dry months of 0.316 as r counting, r table of 0.271 and significance of 0.027 with significant correlation at 0.05 or 5%. The results show that r counting > r table and significance < significant correlation which shows the influence of seasonal changes seen from the number of dry months to productivity and income, where more and more dry months in one year, the greater productivity and income of salt farmers.

1. Introduction

Indonesia is one of the largest archipelago in the world, with an island number of 13469 islands and beaches of 99093 kilometers [1]. Indonesia which has the title as the longest coastal country in the world [2], has a lot of marine resources, such as fish, shrimp, coral, mangrove and salt. All those who need it can be used as a capital of national development for human welfare.

Indonesia's geographical condition is not only a profit factor, but also a barrier and a constraint. High evaporation in Indonesia results in frequent decline in the amount of salt products due to rain. Unpredictable weather changes in Indonesia, plus the volatility of salt prices and traditional production processes.

One location of salt farming business in Indonesia Located in Pangenan Sub-district, Cirebon Regency located in the coastal area of the North Sea of Java. Based on the Department of Fisheries and Marine Cirebon Regency, salt area in Cirebon Regency about 2944 hectares. The widest area of salt is in Pangenan Sub-district, 1558 hectares, with salt farmers 2777 people, with annual production of approximately 150052 tons [3].

These conditions, many problems cause poverty. Generally salt farmers depend on seawater-dependent marine resources. Climate conditions, less favorable weather changes become natural

factors that inhibit salting process. So will be examined "Effect of seasonal changes on salt productivity in Pangenan District, Cirebon Regency in 2013 and 2014".

2. Material and Method

2.1. Study Area

Pangenan Sub-district, Cirebon Regency is located in the coastal area of Java Sea. Based on the geographical location of Pangenan Sub-district is in position 6°45'05" - 6°50'45" South Latitude and 108°38'00 "- 108°42'35" East Longitude. Pangenan District with an area of 21.02 km^2 is bordered by Java Sea in the north, Astanajapura Subdistrict in the west, Karangsembung Subdistrict in the south, and Gebang Sub-district in the east. There are 9 villages in Pangenan Sub-district, namely Astanamukti, Pangarengan, Japura Lor, Beringin, Rawaurip, Bendungan, Pangenan, Getrakmoyan, and Ender [4].

Figure 1. Administration Map of Pangenan Sub. district

2.2. Data Collection

The data collection in this study is divided into 2, namely primary and secondary data collection. Secondary data collection includes:

1. Land use maps from the Geospatial Information Agency
2. Administration Map of Geospatial Information Agency
3. Data of salt and production business ownership of the Department of Fisheries and Marine Cirebon Regency
4. Data of dry months from the Department of Fisheries and Marine Cirebon Regency

Primary data collection is to interview respondents with a questionnaire guide to the criteria of informants:

1. Growers of salt
2. The owner of the salt pond
3. Owners and salt farmers
4. Owner of salt processing

2.3. Data Processing

Data processing is done by using quantitative method through Pearson Product Moment (PPM) method. The formula used is:

$$r_{xy} = \frac{n\sum_{i=1}^{n} X_i Y_i - (\sum_{i=1}^{n} X_i)(\sum_{i=1}^{n} Y_i)}{\sqrt{n\sum_{i=1}^{n} X_i{}^2 - (\sum_{i=1}^{n} X_i)^2}\sqrt{n\sum_{i=1}^{n} Y_i{}^2 - (\sum_{i=1}^{n} Y_i)^2}} \quad (1)$$

r_{xy} is correlation coefficient between *X* and *Y* , X_i and Y_i is Independent variable (*X*) and dependent Variable (*Y*) i data [5].

2.4. Data Analysis

Find out the relation between season change and salt productivity then searching salt productivity data year 2013 and 2014. If r counting ≥ r table then there is a significant relationship between seasonal changes with salt productivity. Whereas if r counting < r table then there is no relationship between season changes with salt productivity. Find out the relation between seasonal change with salt farmer income hence conducted search of salt farmer income data year 2013 and 2014. If r counting ≥ r table then there is a significant relationship between season change with salt farmer income. Meanwhile, if r counting < r table then there is no relationship between season changes with salt farmer income

3. Result and Discussion

3.1. Land Cover and Survey Locations

Cirebon Regency mostly land use is dominated by inland waters as a barrier between the mainland area of Cirebon Regency and Java Sea area. The inland waters in question is a pond business which mostly consists of salt pond business which became the research topic. This salt farming business is done by salt farmers during the dry season. While in the rainy season, salt pond business is replaced with shrimp and milkfish farming business [6].

Based on the survey location map in Pangenan Sub-district, Cirebon District, Rawaurip Village has the largest saltwater pond area among the three villages that are the sample of the research location. This will affect the production of salt so that affect the amount of productivity in the Village Rawaurip, District Pangenan, Cirebon [7].

In 2013, the highest salt productivity is owned by Mr. Rudi which is 59.37 ton / ha. While the lowest salt productivity is salt productivity at Mr. Said that is only 5.12 ton / ha. The mean of salt productivity from each sample of salt farmers in the three villages in the study sites was 32.71 ton / ha. Salt productivity in 2014 has increased 2-fold. This is influenced by the number of dry months. Where in 2013 there are 2 dry months whereas in 2014 there are 4 dry months. So the increase of salt productivity from 2013 to 2014 will affect the income of salt farmers.

3.2. Income

Total income of salt pond farmers in three villages namely Rawaurip Village, Bendungan Village, and Pangenan Village varies considerably. The highest salt farmers income is owned by Mr. Marzuki which is IDR 52000000 per year while the lowest salt income occurs on Mr. Walid which is only IDR 2176000 per year. Most of the salt farmers income per year is below 10 million. However, if calculated on average, salt farmer income per year in the three villages that became the research sites of Rawaurip Village, Bendungan Village, and Pangenan Village amounted to IDR 14003611. Total salt farmers income in 2014 has increased almost twice that of salt farmers in 2013. This is due to the large number of dry months in 2014 by 4 months. While in 2013 has a dry month as much as 2 months. So farmers are better able to produce more salt from 2013. So the salt farmers income in 2014 will be greater than salt farmers incomes in 2013.

Figure 2. Land Cover Map of Pangenan Sub-disrict

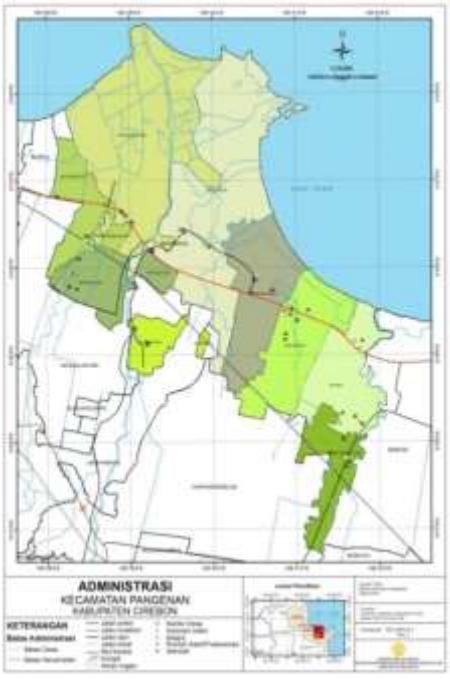

Figure 3. Map of Survey Locations

Table 1. Salt Production 2013 and 2014

Location	Prod. 2013 (ton)	Prod. 2014 (ton)	Land Area (Ha)
Rudi	6.4	12.8	0,11
Kadim	14.4	28.8	1
M. Tohya	45	90	1,5
Tohari	25.6	51.2	0,6
Arman	6.72	1344	0.5
Sakmad	20.16	40.32	0.5
Kamal	19.20	38.4	0.5
H. Sanim	80	160	5
Sutarno	20	40	0.5
Sutarto	20	40	0.5
Lukman	40	80	1
Wasrab	16	32	0.5
Said	5.28	10.56	0.48
Walid	3.84	7.68	0.75
Cholifah	32	64	0.75
Sumiah	14.4	28.8	0.28
Hasan	32	64	0.5
Marzuki	80	160	0.5

Table 2. Salt Productivity 2013 and 2014

Location	Prod. 2013 (ton/ha)	Prod. 2014 (ton/ha)
Rudi	59.37	118.74
Kadim	14.4	28.8
M. Tohya	30	60
Tohari	42.67	85.33
Arman	13.44	26.88
Sakmad	40.32	80.64
Kamal	38.4	76.8
H. Sanim	16	32
Sutarno	40	80
Sutarto	40	80
Lukman	40	80
Wasrab	32	64
Said	11	22
Walid	5.12	10.24
Cholifah	42.67	85.33
Sumiah	51.43	102.86
Hasan	32	64
Marzuki	40	80

Table 3. Total Income of Salt Farmers in 2013 and 2014

Location	Income 2013 (IDR)	Income 2014 (IDR)	Location	Income 2013 (IDR)	Income 2014 (IDR)
Rudi	2997333	5589333	Sutarto	9533333	18133333
Kadim	7320000	13440000	Lukman	19066667	36266667
M. Tohya	21225000	39900000	Wasrab	7733333	14933333
Tohari	16341333	29525333	Said	2552000	4928000
Arman	3136000	5824000	Walid	2176000	4096000
Sakmad	10248000	18816000	Cholifah	16533333	30933333
Kamal	9056000	17024000	Sumiah	8100000	15120000
H. Sanim	44000000	80000000	Hasan	9680000	17920000
Sutarno	10366667	19466667	Marzuki	52000000	96000000

3.3. The Effect of Season on Productivity and Income

The result of calculation of correlation between season change and productivity as in Table 4 which shows correlation value Pearson 0.368 as r counting, Significance equal to 0,023, and amount of data 38 where r table equal to 0,320 and correlation significant at 0.05 or 5%. The value of r and significance is the value used as a comparator in determining which hypothesis is accepted. The calculation results show that r counting > r table (0.368 > 0.320) and significance < significant correlation (0.023 < 0.05) so that H0 is rejected and H1 accepted. There is an effect of dry months in 2013 and 2014 on productivity in both years.

Table 4. Correlation between Productivity with Number of Dry Month

		Productivity	Number of Dry Month
Productivity	Pearson Correlation	1	.368
	Sig. (2-tailed)		.023
	Sum of Squares and Cross-Product	114660.111	767.478
	Covarience	3098.922	20.743
	N	38	38
Number of Dry Month	Pearson Correlation	.368	1
	Sig. (2-tailed)	.023	
	Sum of Square and Cross-product	767.478	38.000
	Covarience	20.743	1.027
	N	38	38

*.Correlation is significant at the 0.05 level (2-tailed)

This result is also in accordance with the description of the salt farmers who served as the sample. When asked about the number of once-harvested crops all farmers responded to a range of 3 sacks for a plot where each sack had a capacity of 60-70 kg. No answer indicates any other size at each harvest. This means there is a certain size every time the harvest is done 3-4 days. So the amount of production is influenced by the amount of time of harvest or dry month in one year.

Table 5. Correlation between Income with Number of Dry Month

		Income	Number of Dry Month
Income	Pearson Correlation	1	.316
	Sig. (1-tailed)		.027
	N	38	38
Number of Dry Month	Pearson Correlation	.316	1
	Sig. (1-tailed)	.027	
	N	38	38

*.Correlation is significant at the 0.05 level (2-tailed)

The calculation of the relationship of income with the number of dry months in Table 5 shows the result of r counting as Pearson Correlation of 0.316. This value is greater than the r table value of 0.271 (r counting > r table). As for the significant correlation 0.05 significance value is 0.027 (0.027 < 0.05). Both values indicate that H0 is recoeffijected and H1 is accepted. So as to prove that there is an influence of the number of dry months in 2013 and 2014 to salt farmers' income in both years. Although the effect is not directly because the number of dry months affect the production and selling price.

Two correlation calculations performed between the number of dry months with productivity and the number of dry months with income indicate a positive relationship. This means that the number of dry months affects both productivity and income. In 2013, consisting of only 2 dry months or months of production, the value of productivity and income is low. While in the year 2014 with the number of dry months more that is for 4 months, both productivity and income show high value.

4. Conclusion

Productivity of salt business and salt farmer income is directly proportional to the duration of the dry month. Therefore salt productivity and salt farmer income will be higher if dry months occur for a long time, as well as the opposite effect of productivity and salt farmers income also because of the farmers themselves and other natural influences.

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