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# Effect of Knowledge and Motivation Toward Seaweed Farmers' Cultivation Behavior

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## Abstract:

**This study was carried out to solve the problem of the ice-ice disease faced by seaweed farmers. The purpose of this research was to describe the effect of ice-ice disease knowledge and seaweed farming knowledge to cutivation behavior; the effect of ice-ice disease knowledge, and the seaweed cultivation knowledge to the cultivation motivation; and the effect of cultivating motivation to the cutivation behavior of the seaweed farmers. This research is a correlational study to look at the relationships between exogenous with endogenous variables. The study involved 60 seaweed farmers in Tablolong village. The data of this study consists of cultivation behavior and motivation collected by questionnaire, the data about knowledge of ice-ice disease, and seaweed cultivation gathered through the knowledge test sheet. Data were analyzed by path analysis through SPSS for Window.The results showed that there is a direct effect of the ice-ice disease knowledge toward the cultivation motivation but not for cultivation knowledge; and there is a direct effect of the cultivation motivation to the cultivation behavior. It can be concluded that the ice-ice knowledge directly effect toward cultivation motivation and the cultivation motivation effect toward behavior of the seaweed farmers in Kupang district.**

**Keywords:** behavior, cultivation, knowledge, motivation

## 1.0 Introduction:

The research to explain about three aspects of the triangle into ice-ice disease has been done but the ice-ice disease can not be overcome. According to the authors, one important aspect that has not received much attention from researchers that the behavior of the seaweed farmer. Cultivation behavior closely related to the behavior in determining the location of cultivation, seed selection, cultivation techniques, maintenance and control of pests and diseases. The standard procedure of the seaweed cultivation based on seaweed cultivation requirements proposed by Afrianto and Liviawaty (1993), Aslan (1998), Sadhori (1995), and Kordi (2011).

The behavior of the seaweed cultivation affected directly or indirectly by knowledge and cultivation motivation. It is assumed that the seaweed farmers who have knowledge about the causes of ice-ice disease, the spread of the disease and controlling techniques; knowledge about cultivation as seed selection, planting, cultivation techniques, maintenance and control of disease tends have a strong motivation in the cultivation of seaweed and show cultivation behavior in accordance with the standard procedures. Mulyadi (2011) concluded that increased knowledge about the environment will be increase the motivation of the farmers to farm. Gustisyah (2009) divides the factors that affect the motivation of two parts, namely the external factors and internal factors. Internal factors consist of maturity self, educational level, desires and personal expectations, needs, fatigue and boredom, and job satisfaction. External factors that affect motivation consists of working conditions, adequate compensation, good sepervision, guarantee of career (achievement award), the status and responsibilities, and flexible rules.

In terms of behavior, motivation variable is the force that drives a person to perform an action. Uno (2012) argues that the motivation comes from the word motive which can be interpreted as the power contained within the individual, which causes the individual to act Zhu, Yurong and Jinxiu

Yang (2012) explains that motivation is the tendency of psychology and internal impulse that stimulates and regulates the actions of an organism. Herath (2010), explains that the motive is a set of reasons that determines one to engage in a particular behavior. Motive is an internal drive or desire from within which encourages people to organize themselves to achieve a goal through activity. In connection with the foregoing, the research on the effect of cultivating knowledge and motivation to behavior of the seaweed farmers in Kupang district is very important to know the contribution of each factor on the behavior of seaweed farmers as a material consideration in the determination of policy development in the field marine and fisheries, especially in the empowerment of farmers in seaweed farming. The results of this study are also expected to contribute positively in the context of ice-ice disease control through the cultivation behavior based on the standard procedures.

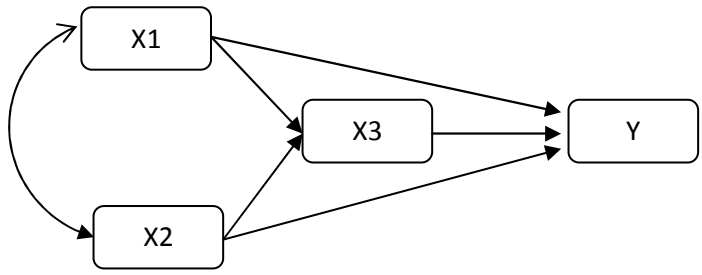
## 2.0 Research Method:

### A. Location and Time study

This research was conducted in the village Tablolong Western Kupang of Kupang District. Based on the choice of location is a consideration that Tablolong as a center of seaweed production in Kupang district. This study was conducted over 6 months (September 2013 to February 2014).

**B. Research design of the study**

This study is a correlational study designed to determine the correlation relationship is exogenous and endogenous variables. The relationship between exogenous and endogenous variables can be seen in Figure 1 below.




Description:

X1 = The knowladge of ice-ice disease
X2 = The konowladge of seaweed cultivation
X3 = The motivation of seaweed cultivation
Y = The Cultivation Behavior of the seaweed farmers

**Figure 1.** The relationship between the variables

**C. Research Variables**

The study consist of four variables, namely knowledge of ice-ice disease (X1), knowledge about the cultivation of seaweed (X2), seaweed cultivation motivation (X3) and cultivation behavior (Y). In the first sub-structure, the variables X1 and X2 as exogenous variables that affect the motivation of seaweed cultivation ( X3 ) as an endogenous variable. In the second sub-structure, the variable X1 , and X2 as exogenous variables that affect the cultivation behavior (Y) as an endogenous variable. In the third sub-structure, X3 as exogenous variables that affect the variable Y as an endogenous variable.

**D. Population and Sample**

In this study, researchers only use seaweed farmers of Tablolong village as the sample with the consideration that the amount of seaweed farmers of this village compared to most other villages, that is 495 people or 63.12 % of 716 seaweed farmers of Kupang West districts. Besides the amount of seaweed farmers the most, larger farms compared with other rural farms is 9.2 ha. Another consideration in determining the nature of the sample is a sample homogeneity. Seaweed farmers in the district of Kupang West in general have a low educational level, therefore it is assumed that the population is homogeneous. Because the population is homogeneous, the researchers used simple random sampling technique to assign members of the sample. Sugiyono ( 2013) argues that simple random sampling is a sampling technique of the population was randomly without

regard to existing strata in the population. With regard to the sample size, Hendry (2010) summarizes a number of sources and suggested that the minimum sample size for survey research of 100. Jaya and Sumertajaya (2012) suggested that a sample size of at least 10 times the number of indicators . The total sample of five to 10 times the amount of the overall indicator variables. Therefore, in this study used 60 seaweed farmers as the sample.

**E. Collection and Analysis of Data**

The collection of data about knowledge of seaweed farmers through knowledge tests conducted using test sheet instruments. The instrument consists of a sheet of test knowledge about ice-ice disease, and the knowledge of seaweed farming. Data on the cultivation motivation and behavior collected by distributing questionnaires of motivation and behavior to be filled by seaweed farmers. Data were analized by path analysis.

## 3.0 Results and Discussion:

**A. Description of Research Data**

The results of the descriptive statistical analysis of varaibel knowledge of ice-ice disease (X1), knowledge about the cultivation of seaweed (X2), motivation cultivation (X3) and behavior of seaweed cultivation (Y) are presented in Table 1,the summary of analysis descriptive statistics.

**Table 1. Summary of Descritive Statistical Analysis of the Variables**

| Variabel | Max | Min | Range | Mean | Median | Modus | SD | Varians |
|---|---|---|---|---|---|---|---|---|
| Knowledge of ice-ice disease | 23,00 | 11,00 | 12,00 | 17,05 | 18,00 | 18,00 | 3,03 | 9,17 |
| Knowledge of cultivation | 32,00 | 5,00 | 21,00 | 22,67 | 22,50 | 22,00 | 4,73 | 22,36 |
| Motivation of cultivation | 150,00 | 42,00 | 108,00 | 121,87 | 127,50 | 130,00 | 23,57 | 555,54 |
| Behavior of cultivation | 156,00 | 49,00 | 107,00 | 116,33 | 117,00 | 99,00 | 20,75 | 430,50 |

Based on Table 1 above concluded that measures of central tendency mean, median and mode of the variable knowledge of the ice-ice disease and knowledge about seaweed farming nearly coincident. While the motivation variable of the seaweed cultivation, the mean, median and mode varies, ie, 121.87 ; 127.50 and 130. Variables of the Cultivation behavioral is seen that the mean and median almost coincident with the value of each 116.33 and 117 while the mode value of 99.00. The standard deviation of the knowledge of ice-ice disease, knowledge of seaweed cultivation, motivation of seaweed cultivation and bevarior of seaweed cultivation is 3.03 ; 4.73 ; 23.57 and 20.75 respectively.Descriptive analysis was also portray that the respondents answered correctly 17 items from 28 items of the test about the knowledge of ice-ice disease and 22.67 or 23 items of the test of the seaweed farming knowledge. In the variable of seaweed cultivation motivation with an average score of 121, indicating that the seaweed farmers agreed to the questions in the questionnaire of seaweed cultivation motivation. Similarly, variables of cultivation behavioral, the average respondent claimed to act or behave often cultivated by the standard procedures.

**B. The Direct Effect**

***1. The direct effect of knowledge seaweed farming toward the motivation***

Direct or indirect influence of exogenous variables on endogenous variable known based on the value of the path coefficient. To calculate the path coefficients, then the first step is to calculate the value of the correlation between variables. The structure of the relationship or correlation between knowledge of ice-ice disease, knowledge of the cultivation of seaweed and motivation recorded in the following matrix

**Tabel 2. Matrix of Correlation Between Variable X1, X2 and X3**

| | X1 | X2 | X3 |
|---|---|---|---|
| X1 | 1 | 0,399** | 0,263* |
| X2 | 0,399** | 1 | -0,116 |
| X3 | 0,263* | -0,116 | 1 |

Description:

X1= Knowledge of ice-ice disease
X2= Knowledge of seaweed cultivation
X3= Motivation of seaweed cultivation

The matrix showed that the correlation between X1 with X2 is very significance and X1 with X3 is significance, but the correlation between X2 with X3 not significance. Results of the regression models testing the relationship between exogenous and endogenous vaiabel can be seen in Table 3.

**Table 3.** Summary Anova Regression Model with Exogenous Variables X1 and X2 and X3 Endogenous Variables

| Model | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 4154.545 | 2 | 2077.273 | 4.137 | .021[a] |
| Residual | 28622.388 | 57 | 502.147 | | |
| Total | 32776.933 | 59 | | | |

a. Predictors: (Constant), X2, X1, b. Dependent Variable: X3

**Table 4.** Path Coefficients with the Endogenous Variable X3

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 106.761 | 19.533 | | 5.466 | .000 |
| X1 | 2.858 | 1.051 | 0.367 | 2.720 | .009 |
| X2 | -1.463 | .753 | -0.262 | -1.943 | .057 |

a. Dependent Variable: X3

Based on the results of this calculation, the regression model of a direct relationship between the variables of knowledge of ice-ice disease (X1) and knowledge of cultivation (X2) with a seaweed cultivation motivation as follows:

X3 = 0,367X1 – 0,262X2 + ε

Based on the ANOVA shows that the $F_{calculated}$ value of 4.137 is greater than the $F_{table}$ 3.519 (db 2/57). Therefore, the $F_{calculated}$ is greater than the $F_{table}$, then the regression model is accepted or can be used to predict the relationship between motivation variables with variable of knowledge about ice-ice disease and knowledge about seaweed cultivation. The calculations show that the coefficient is significant $p_{31}$ pathway where 0.009 < 0.05 and $p_{32}$ pathways are not significant coefficients where 0.057 > 0.05, it can be concluded that the variable of knowledge about ice-ice disease directly influence the motivation of seaweed cultivation and variables of seaweed farming knowledge not influence the motivation of seaweed cultivation.

Because variable of the knowledge about sea cultivation (X2) does not significantly affect the motivaton of seaweed cultivation (X3), then removed from the model. Triming results as follows:

X3 = 0,263X1 + ε

While the influence of factors began with P3ε value of $\sqrt{1 - R^2}$ = $\sqrt{1 - 0{,}069}$ = 0,964

Contributions influence of the variable of knowledge about ice-ice disease to the motivation of seaweed cultivation can be seen in diagram 1 below sub-structure. Based on this figure, we conclude that the direct influence of the knowledge about ice-ice disease to the motivation of seaweed cultivation is 0,263

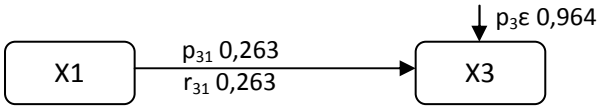



**Figure 2.** The direct effect of variables X1 to X3

**Tabel 5.** Matrix Correlation Between X1, X2 and Y

| | X1 | X2 | Y |
|---|---|---|---|
| X1 | 1 | 0,399** | -0,016 |
| X2 | 0,399** | 1 | -0,120 |
| Y | -0,016 | -0,120 | 1 |

Description: Y = Behavior of seaweed cultivation, X1= Knowledge of ice-ice disease, X2= Knowledge of seaweed cultivation

***2. Direct Effect of knowledge to the Behavior***

The structure of the relationship between X1, X2 and Y as shown in the following correlation matrix. Based on the correlation matrix above, it can be argued that the correlation between variables of the knowledge of ice-ice disease (X1) and the knowledge of seaweed cultivation (X2) are very significant, while the correlation between variables of the knowledge of ice-ice disease (X1) and variable of the behavior of seaweed cultivation (Y) and the correlation between the knowledge of seaweed cultivation (X2) and variable of the behavior of seaweed cultivation (Y) are not significant with negative correlation direction. Furthermore, the path coefficient calculation with the results as shown below.

Based on Table 5 and Table 6 it can be argued that the regression model of the relationship between exogenous variables X1 and X2 with the endogenous variable Y is not significant. Futhermore, this model can not used to predict direct effect of the knowledge variables of ice-ice disease and knowledge of seaweed cultivation toward the cultivation behavior.

**Table 6.** Anova Summary of Regression Relationships Between Variables X1 and X2 with Y

| Model | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 397.218 | 2 | 198.609 | 0.453 | 0.638[a] |
| Residual | 25002.116 | 57 | 438.634 | | |
| Total | 25399.333 | 59 | | | |

a. Predictors: (Constant), X2, X1, b. Dependent Variable: X3

**Tabel 7.** Matrix Correlation Between X3 and Y

| | X3 | Y |
|---|---|---|
| X3 | 1 | 0,263* |
| Y | 0,263* | 1 |

Description: Y = Behavior of seaweed cultivation, X2= Motivtion of seaweed cultivation

*3. Direct effect of the Seaweed Cultivation Motivation to the Seaweed Cultivation Behavior.*

The correlation between motivation variable X3 with variable Y can be seen in the following correlation matrix.Based on the above matrix relationship, it can be argued that there is a significant relationship between exogenous variables of the seaweed cultivation motivation(X3) with endogenous variable of the seaweed cultivation behavior (Y) with a Pearson correlation value of 0.263. Determinating of the relationship regression model between variables X3 with Y and calculation of the path coefficient of X3 is carried out with the following results:

Table 8. Anova Summary of Regression Models the Relationship Between the Variables X3 with Y

| Model | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 1758.353 | 1 | 1758.353 | 4.314 | .042[a] |
| Residual | 23640.981 | 58 | 407.603 | | |
| Total | 25399.333 | 59 | | | |

a. Predictors: (Constant), X3, b. Dependent Variable: Y

**Table 9.** Path Coefficients of X3 to Y

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 88.107 | 13.838 | | 6.367 | .000 |
| X3 | .232 | .112 | .263 | 2.077 | .042 |

a. Dependent Variable: Y

Based on Table 5 and 6 above shows that the $F_{calculated}$ value is 4.314 with a significance value 0.042 < 0.05, therefore concluded that the regression model can be used to explain the relationship between variables or the direct influence of seaweed cutivation motivation to the cultivation behavior of the seaweed farmers in Kupang District. Regression model of the relationship as follows:

$$Y = 0.263\ X3 + \varepsilon$$

The regression model suggests that any increase in the value of the variable Y by 1 unit is always followed by an increase in the variable X3 as much as 0.263 units. Value of the effect of the external factors $p_{y\varepsilon}$ is $\sqrt{1 - R^2} = \sqrt{1 - 0{,}069} = 0{,}964$ The results of calculations also indicate that path coefficient $p_{y3}$ is significant where the value of the path coefficient 0.042 < 0.05. Thus concluded that the motivation variables affect the cultivation behavior of the seaweed farmers in Kupang District. Contributions influence of varabel X3 on Y can be described as follows: Based on this figure 3 concluded that the direct effect of X3 to Y is 0.263

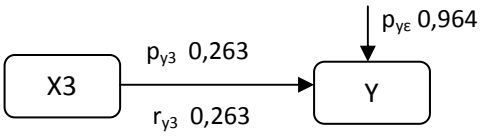



**Figure 3.** Direct effect of X3 to Y

**B. Indirect Effect of knowledge to the cultivation behavior**

Based on the structural analysis of the sub, then the indirect effect of the variable knowledge of ice-ice disease of the endogenous variables are described as follows:Based on this image concluded that indirect effect of the knowledge of ice-ice disease (X1) through the motivation of seaweed cultivation (X3) toward the behavior of seaweed cultivation (Y) at 0,263 x 0.263 = 0.069.

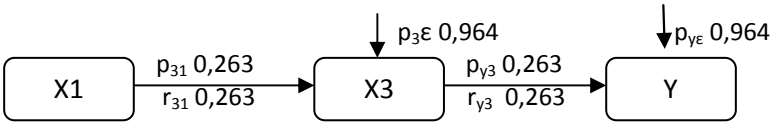



**Figure 4**. Indirect effect of X1 dan X2 through X3 to Y

**C. Total Effect**

Based on Figure 2, 3 and 4, then the total effect of the influence of exogenous variables, either directly or indirectly to the endogenous variables as follows :

1. The direct effect of X1 to X3 = 0.263
2. The direct influence X3 to Y = 0.263
3. Indirect effect of X1 to Y through X3 = 0.069
4. The influence of other factors on the X3 = 0.964
5. The influence of other factors on Y = 0.096

Based on the research and discussion, the model that's proposed is then modified as follows:

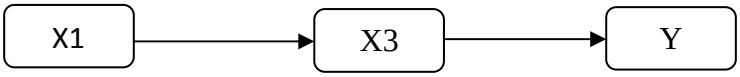



**Figure 5.** Model of Relationship between the ice-ice disease knowledge (X1), the cultivation motivation (X3) and the cultivation behavior (Y)

Based on data analysis, it can be described the influence of exogenous variables on endogenous variables as follows:

1**) The direct effect of knowledge about ice-ice disease toward the seaweed cultivation motivation.**

The results of path analysis proves that occurs directly influence the knowledge of ice-ice disease to the motivation of seaweed cultivation with a contribution of (0,263 x 0,263) x100% = 6,92%. This means that the indicator of the knowledge variable of the ice-ice disease such as the characteristics of ice-ice disease, the causes, and spreading, and controling of ice-ice disease accounted for 6,92 % to the motivation of seaweed cultivation. The seaweed farmer motivated to cultivate the seaweed because farmers have the knowledge of ice-ice disease.Gordon and Fitzsimmon (2007) concluded that an important outcome of their research is a better understanding of the motivational and cognitive factors that influence entrepreneurial opportunity. Furthermore, by using functional measurement to describe the structure of relationships between knowledge and motivation. Mulyadi (2011) showed that environmetal knowledge directly effect toward the motivation of the farmers.

Direct effect of the ice-ice disease knowledge to the seaweed cultivation motivation can that the seaweed farmer know that the ice-ice disease can make them unfavorable, then the seaweed farmer motivated the seaweed base on standard operating. The seaweed as a important resources for the people, therefor it can motivated them to maintanance and protect the seaweed of the ice-ice disease. Dartey-Baah and Amoaka (2011) describes that the motivational-hygiene model states that employee motivation is achieved when employees are faced with challenging but enjoyable work where one can achieve, grow, and demonstrate responsibility and advance in the organisation. That is, when the employees' efforts are recognized, it brings about job satisfaction and motivation. When the seaweed farmers know about the characteristics of ice-ice disease, the cause of ice-ice disease, spread of disease, the ice-ice disease is a challenge that must be faced by seaweed farmers. This challenge encourages farmers, farmers' awakens the desire and passion to make the cultivation of seaweed in accordance with existing standards. Seaweed suffering ice-ice disease is an object of knowledge and seaweed also become an object to fulfill basic needs. This condition is an incentive for farmers to undertake cultivation to meet their needs.

Farmers' knowledge is closely related to education level. This means that the higher the education level, the higher the level of knowledge. In connection with the ice-ice disease, the higher the level of education the higher the level of knowledge of the ice-ice disease. This does not mean that only the knowledge of the ice-ice disease provide a challenge for seaweed farmers to make seaweed cultivation. However, many other knowledge to contribute to the motivation seaweed farmers. Siagian (2012) explains that understanding motivation requires different disciplines or different kinds of knowledge

**2) The direct effect of seaweed cultivation motivation toward cultivation behavior.**

The results of the data analysis showed that there was a direct influence of the cultivation motivation to the behavior of the seaweed cultivation with a contribution of (0,263 x 0,263) x 100% = 6,92%. This means an indicator of the seaweed cultivation motivation variable, namely the urge to meet basic needs, simple technologies , the location of the cultivation suitable and the support of government influence the seaweed cultivation behavior in selecting the appropriate location of aquaculture, binding of seaweed seedwith the ideal distance, using appropriate farming technologies, seaweed maintenance and harvesting. The seaweed cultivation behavior will be formed if the seaweed farmers have a strong cultivation motivation. The desire to meet basic needs, the technology is simple and inexpensive cultivation, appropriate locations of cultivation and support from the government will motivate farmers to show the behavior of cultivation based on standard operating.The results are consistent with research Mulyadi (2011) found that the contribution of a motivation toward variable of environmentally responsible behavior by 4.20%. Thereby increasing the motivation to farm will improve also

responsible environmental behavior of farmers in managing agricultural land.

While Herath (2010) integrates the Self Determination Theory (SDT) to the theory of planned behavior where SDT (intrinsic and extrinsic motivation) directly affects the interest to behave and strengthen the interest to actually behave. So in SDT, motivation is not directly influence actual behavior but by intention to behave. While the results of this study and the results of research Mulyadi (2011) showed that there was a direct influence of the cultivation motivation to the behavior of the farmers. The same research carried out by Cowdory and Amin (2001) and they argue that motivation is the process of arousing and sustaining goal-directed behavior. Both intrinsic and extrinsic motivation plays an important role in influencing employee work performance.

In this study the indicator of motvation to meet the basic needs causes seaweed farmers do cultivation activity. This means that the basic needs of the goal. Activity of cultivation need the desire, without desire aquaculture activity will not take place in accordance with existing standards. The desire of the self is an autonomous motivation (intrinsic motivation). The others Indicator such as suitable locations, simple technologies and government support are also as motivating factor in the seaweed cultivation or referred as controlled motivation (extrinsic motivation). Ganné (2009), Osterloh (2000), Ganné and Dec (2005), Leper, Lyengar and Corpus (2005) and Alimohammadi, M., and Neyshabor, AJ (2013) explains that the motivation is divided into two parts, namely intrinsic motivation and extrinsic motivation. According to the authors, autonomous motivation and controlled motivation complement each other in motivating seaweed farmers. The desire to do the cultivation with the aim to meet basic needs as supported by simple cultivation technology and available the suitable locations. In addition, government support to maintain price stability, provide relief equipment and provide transportation so seaweed farmers cultivated with pleasure. Motivation cultivation with all indicators directly influence the behavior of the cultivation of seaweed farmers. Both intrinsic and extrinsic motivation encourage the seaweed farmers to determine the appropriate location of cultivation, selecting quality seeds, seedlings binding with an ideal distance, perform maintenance environmental quality of cultivation location and neighborhoods. The behavior of the cultivation of this boils down to one purpose gain to meet the need.

Indirect Effect of knowledge of ice-ice disease through the cultivation motivation toward behavior of seaweed cultivation. The results of the data analysis showed that there was no direct effect knowledge of ice-ice disease to the cultivation behavior of seaweed farmers. Effect of knowledge of ice-ice disease variable to the behavior variable through cultivation motivation variables with a contribution of 0.096 x 100 % = 9.6% . This means that knowledge of ice-ice disease, such as the characteristics of ice-ice disease, causes of ice-ice disease, spread of ice-ice disease owned by seaweed farmers have not been able to direct effect the seaweed cultivation behavior based of the seaweed farmers in selecting seed of seaweed, binding with the ideal distance, using proper cultivation technique, maintaining and harvesting seaweed. Farmers know that seaweed could provide financial benefit to them. Therefore, when they know that the ice-ice disease can affect the production of seaweed, so they decided that the disease is a challenge that must be controlled. It can motivate farmers to undertake farming activities in accordance with the standards

## 4.0 Conclusion:

Based on the results of research and discussion concluded as follows:

1. Knowledge of ice-ice disease directly affects the motivation of seaweed cultivation. The seaweed farmer who have a high knowledge of ice-ice disease than they also have a strong motivation to undertake cultivation of the seaweed.
2. Motivation of seaweed cultivation directly influences cultivation behavior of the seaweed farmers. The higher the motivation to do cultivation, the higher the cultivation behavior based on the standard procedure of the seaweed farming.
3. Knowledge of ice-ice disease affects indirectly through cultivation motivation to cultivation behavior of the seaweed farmers. High and low behavior based on the standard procedure of the seaweed farming affected by the knowledge of ice-ice disease and seaweed farming motivation.

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