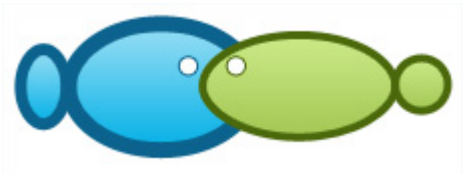

Factors affecting the behavior of farmers toward the risk of seaweed farming in the Bungin Permai village, southeast Sulawesi, Indonesia

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Abstract. This research was conducted in the Bungin Permai village of Tinanggea Sub-district of Konawe Selatan District, Southeast Sulawesi Indonesia. The aims of this research were to know the socio-economic factors that affect the behavior of farmers toward the risk of farming seaweed. Farmer samples determined the usage of simple random sampling methods. The number of samples in this research counted a number of 37 (seaweed farmers). Analytical techniques used in this research is twofold, namely the utility quadratic function to analyze the behavior of farmers against risks, and multiple linear regression analysis was used to analyze the socio-economic factors that affect the behavior of farmers toward the risk. The results of the analysis show that the behavior of farmers towards risks are risk averse 86.48% of farmers, risk lovers 5.41% of farmers, and risk neutral 8.11% of farmers. The experience of farming and extensive construction will increase the reluctance of farmers toward the risk, while the revenue will increase farmer's courage toward the risk of farming.
Key Words: farm risk, habitus, Bajo community, risk management, socio-economic.

Introduction. Research on risk has been performed in many countries, both in Indonesia and abroad. In China, risk research was conducted by Liu & Huang (2012) to know how the farmers preference influencing the use of pesticide in cotton farming in China. In Nigeria, Akinola (2014) conducted a study to: (a) analyze poultry farmers 'preferences in Abeokuta, Nigeria, (b) to identify socio-economic factors that influence poultry breeders' behavior on risk, (c) to know the risk management strategies undertaken by poultry farmers.

The next review was conducted by Bard and Barry (2001) who examined farmers' attitudes in assessing risks using the "Closing-In" method. In Ghana, Acquah and Dadzie (2012) studied the attitude toward risk and overcome it: the case of food crops of farmers in East Agona District. Piet & Bougherara (2016) find out how the farmers' risk preferences influence on the design of individual crops insurance. Hansona et al (2004) research results show that organic farmers from different regions of the United States identified a wide range of risks to their operations in a series of focus groups during 2001 and 2002. Contamination of natural creations from hereditarily changed living beings was viewed as a noteworthy hazard, especially by grain, soybean, and cotton farmers (Hanson et al 2004). Centre gathering members creating grains and cotton a large number of who thought about and had acquired product protection raised worries about scope offered, including the requirement for protection to reflect the higher costs for natural harvests. Most fruit and vegetable producer taking an interest in the concentration bunch had little information of harvest protection.

In Indonesia, risk research has been conducted by Fauziyah (2011) and Abdullah (2015) which studies was performed on agribusiness risk management. Research related to farmer behavior against risk has been performed by Abdullah (2007). The study aims to: (1) know the difference of production cost, and income between non-organic paddy

farming and semi-organic rice farming at 3 planting seasons, (2) compare the risk of baiya, production risk, and income risk between non-organic rice farming and farming (3) comparing the behavior of non-organic paddy farmers and semi-organic rice farmers to farming risks, and (4) to know the socio-economic factors that influence the behavior of non-organic and semi-organic paddy farmers to farming risks.

The study on farmers' behavior on risk was further conducted by Kurniati (2015), to determine the effect of factors of production on soybean productivity and determine the behavior of farmers against the risk of soybean farming.

The research was conducted to find out the factors that affect the behavior of farmers against the risk of seaweed farming in the Bungin Permai village, South Konawe, Southeast Sulawesi.

The village of Bungin Permai is a floating village which is one of the seaweed production centers in Tinanggea sub district, the majority of the population livelihood as seaweed farmer, 80% from 301 families are of Bajo ethnic group. The location of Bungin Permai Village located above the sea is very strategic in developing seaweed cultivation for its residents. Seaweed is one of the leading commodities of marine and fishery sector which has high selling value.

Tinanggea Sub district is one of the areas that become the center of seaweed production in South Konawe Regency. According to Luhur et al (2012) Tinanggea Sub-district occupies the second position which has the largest potential seaweed cultivation area of 4,892 ha, after Laonti Sub-district (5,730 ha), followed by Kolono Sub-district (2,203 ha). According to South Konawe (2014), seaweed production of Tinanggea Sub-district reached 138.45 tons.

Based on the initial survey, the normal production of seaweed in Bungin Permai Village reaches 10 tons in one cycle. In fact the potential is contrary to the level of welfare of seaweed farmers in the village of Bungin Permai. Most of the seaweed farmers in Bungin Permai Village still live below the poverty line.

None of business types will be absolved from risk. Agricultural business is a field where the major risk is influenced nature. The size of the risk experienced by farmers depends on the courage to take a decision (Kurniati 2015). Ratnaningsih (2005) said that the pattern of decision-making is usually more precedence of security than the pursuit of large profits, in other words farmers are more oriented to the attitude of salvage results. The farmer's behavior is one form that farmers prefer to avoid risks.

Differences in behavior among farmers, in the face of the risks applied in agribusiness decision-making, lie between bold decisions and dare not face risks. Accordingly, according to Soekartawi et al (1993) there are three terms of behavior of farmers against risk that is risk averse, risk neutral and risk lovers. The same author states that farmers' behavior in dealing with risks is influenced by several socio-economic variables, including land area, age of farmers, number of family dependents, peasant education, farming experience and land tenure status.

Material and Method. This research was conducted in Bungin Permai Village, Tinanggea District, South Konawe Regency Southeast Sulawesi, Indonesia. Determination of the location of the research was done purposively with the consideration that the location is one of the seaweed cultivation centers in South Konawe Regency. Another reason is that in that location there has never been an analysis study on farmer behavior on the risk of seaweed farming.

The type of data used in this study is primary data and secondary data. Primary data is data obtained directly through systematic interview with priority element of accuracy, consistency, and objectivity of information from seaweed farmers. Secondary data is data obtained through literature information retrieval sourced from literature books, articles, journals and some agencies relevant to this research. Data collection in this study was conducted for three months, from October 2016 to January 2017.

The number of farmers selected as a sample of 37 people from a population of 233 peasants. Determination of respondents using simple random sampling method, the sample size is determined by referring to the Slovin formula (Sevilla 2007), as follows:

$n = N/(N\sigma^2+1)$

Where:
n = number of samples;
N = population;
α = fault tolerance limit (error tolerance).

The level of confidence used was 85% (α = 0.15). According to Steel & Torrie (1993), sampling of farmers in socio-economic research is not less than 5% of the total population that is considered to have been representative.

Factors that influence farmer behavior on risk are analyzed by multiple linear regression analysis, with the formula:

b2 = a + X1Umr + X2Pddkn + X3TgKlrg + X4PglmnUsh + X5LsKntks + X6Pnrmn

Where:
b2 = risk coefficients;
Umr = age of farmer (year);
Pddkn = education (year);
TgKlrg = family dependent (people);
PglmnUsh = business experience (year);
LsKntks = area of construction (ha);
Pnrmn = reception (Rp);
Coefficient of determination (R2)
Test F criterion: sig at α = 0.1 (10%)

Classic assumption test:
1. Multicoleniarity Test
Criteria:
The tolerance value> 0.10 then there is no multicoleniarity
Tolerance value <0.10 then there is multicoleniarity
VIF value <10.0 then there is no multicoleniarity
VIF value> 10.0 then multicoleniarity occurs

2. Heterocedasticity Test
Criteria:
Values significance value> 0.05 then no heterokedastisitas
The value of significance variable <0.05 then happened heterokedastisitas

3. Automation Test
Criteria:
d <dl or d> 4-dL, then there is autocorrelation
dU <d <4-dL, then there is no autocorrelation
dL <d <dU or 4-dU <d <4-dL, then the test result cannot be determined.
Test T criteria: sig at α = 0.1 (10%)

Results and Discussion. The behavior of seaweed farmers to their farming risk can be influenced by socio-economic factors such as age, education, number of family dependents, experience of farming, land area and acceptance (Soekartawi et al 1993). The area of land in seaweed farming is converted into construction area. Factors affecting farmer behavior on seaweed farming risk in Bungin Permai Village Tinanggea Subdistrict of South Konawe Regency can be known by using multiple linear analysis. Variable age (X1), education (X2), family dependent (X3), business experience (X4), LsKntks (X5), and Pnrmn (X6). Factors affecting farmer behavior on risk for 37 seaweed farmers can be seen in Table 1.

The result of regression test of coefficient risk of seaweed farmer with socio-economic variable shows coefficient of determination (R2) equal to 0.264%. This means that only 26.4% of farmer behavior can be explained by age variables, education, family dependent, farming experience, construction area and acceptance, while the remaining 73.6% is explained by other variables outside the model.

Table 1

Socio-economic factors affecting farmer's behavior on seaweed farming risk in Bungin Permai village Tinanggea Sub-District, South Konawe District, 2016

Dependent variable	*Independent variable*	*Regression Coefficients*	*T-C$_{ount}$*	*Sig*	*VIF*
Risk coefficient (b_2)	Intercep	$1.391x10^{-13}$	0.448	0.658	
	Age	$-2.834x10^{-16ns}$	-0.038	0.970	1.904
	Education	$5.217x10^{-15ns}$	0.282	0.781	1.169
	Family dependent	$5.651x10^{-15ns}$	0.128	0.899	1.755
	Business experience	$-1.748x10^{-14*}$	-1.276	0.214	2.103
	Area of construction	$-6.337x10^{-13*}$	-1.241	0.226	2.187
	Reception	$7.842x10^{-20**}$	2.044	0.052	1.444
	R^2				0.264
	F_{count}				1.493
	Sig				0.221^{*}
	Durbin-Watson				1.386

* Significant at α= 0.25, ** Significant at α= 0.10, ns = No Significant.

F test results show significance of 0.221 or significant at 25% error rate. This means that the socioeconomic variable at α 0.1 is not significant, so it can be said that the socio-economic variable proposed by Soekartawi et al (1993) is less able to explain farmer behavior to the risk of seaweed farming in Bungin Permai Village. F test results are significant at α 0.25 and no detectable classic assumptions such as multicolinearity, heteroscedasticity, and autocorrelation. This also means that the t test can be performed as a further test.

Table 1 shows that the t test on each regression coefficient, a significant influence is given only by three socio-economic variables i.e. farming experience, construction area, and acceptance, and is not influenced by age, education, and family dependent variables.

The regression coefficient of variable of farm experience and construction area is negative, whereas the regression coefficient of receipt variable with positive sign are respectively -1.748x10-14*, -6.337x10-13*, 7.842x10-20**. This means that the longer farming experience and the more extensive the farmer's construction will decrease the preferences of the seaweed farmers to the risk of being neutral until the risk is reluctant. In addition, the high income earned by farmers will increase the preference of seaweed farmers to the risk of risk daring.

It is interesting that the length of experience that seaweed farmers have will increase the risk aversion. Conversely, a minimal experience will cause farmers more daring to bear the risk. Based on the results of interviews with respondents it can be explained that, more experienced farmers have gained a lot of information about alternative livelihoods, such as fishing, boat ojek, and trading. So if there is a fairly serious harvest caused by extreme weather, the experienced farmers prefer to run alternative livelihood. Farmers with minimal experience tend to be more challenged to improve their seaweed farming to improve their living standards. This is because their expertise is limited to seaweed farming, so even though they have suffered a serious harvest failure it will not stop their routine for seaweed farming.

Variable construction area has a negative effect. It is interesting that the more extensive a farmer's construction will increase his or her aversion to risk. This happens because in the village of Bungin Permai most of the farmers who become respondents with the construction area of the category are experiencing serious harvest failure. The wider construction owned by farmers means that it will increase the production cost of seaweed farming itself, so that if there is harvest failure the farmers will feel a considerable loss. So the farmers received very little revenue in the last growing season. This resulted in acceptance just enough to meet the needs of the family alone, so no more capital to conduct seaweed farming the next season.

Nevertheless, there are still respondents who have a medium construction area and tend to dare to risk, this is because two respondents with construction area of 0.5 and 0.6 has a high acceptance, it means that in the last growing season of both farmers it does not have a serious risk of failure. So, there is no bored or saturated to do farming in the next planting season.

High revenue will increase farmers' courage to the risk of seaweed farming. This is highly relevant to the results of the study that there are only two farmers from 37 seaweed farmers who become research respondents who behave boldly against risks. Both farmers are the farmers who have the highest receipt of 37 seaweed farmers studied. Conversely, the low acceptance received by seaweed farmers will increase farmers' aversion to the risk of seaweed farming. The result of t test shows that the variable of acceptance is significant at 95% confidence level with significance value of 0.037. This means that the acceptance variable gives significant effect to the risk coefficient.

The interesting aspect is the age variable which has no effect on the behavior of farmers in responding to the risk of seaweed farming. This proves that one's maturity cannot be a benchmark of aversion or courage to face risks. There are farmers with productive age (20-54 years) tending to be reluctant to risk and those who tend to dare to risk. This depends on how the farmer's mindset in meeting the needs of his family and the skills of farmers to run alternative livelihoods. At the same time, farmers with age that are no longer productive (54 years) tend to be reluctant to risk, this is influenced by the ability of working farmers who have decreased, and health factors that are no good like generally productive age.

The variable of education is also very interesting, because it does not affect the behavior of farmers against the risk of farming. If in general the higher level of education will affect farmers 'courage to risk and the low level of education will affect farmers' reluctance to risk, then not so with farmers in Bungin Permai Village. There are farmers with elementary school, junior high school and high school, that tend to be neutral to risk reluctant, and there are also farmers with junior high school and high school education tends to be risk averse. Based on the interviews conducted, capital has an effect on this issue. Although the farmers have a fairly high education, but if they do not have the capital after the harvest failures that occur then it will also cause farmers reluctant to continue seaweed farming in the upcoming season and choose to do jobs that do not require large capital such as fishing.

The dependent variable of family also do not have influence to farmer behavior to the risk of seaweed usage, there are farmer with small family relation number (0-3 people) which tend to be neutral until risk reluctant. There are also farmers with dependents of medium family (4-6 people) who tend to be neutral to risk reluctant and risky. The reason why family dependents have no effect on peasant behavior is, because each farmer has a different mindset and different abilities in meeting the needs of his family. There are farmers who think that the urgency of need with the large number of families to bear requires them to get out of the unfavorable zone, there are also farmers who have the idea that they must stay to continue their seaweed farming even if they have failed before. Farmers with such orientations have some considerations both in terms of capital and the outlook on the success of farming.

The results of this study prove that the socio-economic variables as proposed by Soekartawi et al (1993) is less able to give influence to farmer behavior to seaweed farming risk in Bungin Permai Village, seen from result of regression R2 = 0.264, it means that the representative socioeconomic variable is 26.4%. Some social economy variable such as age, education, family dependent, farming experience, and construction area has not significant effect.

In fact, there are only three socioeconomic variables that are able to significantly influence farmers' behavior on the risk of seaweed farming, i.e. farming experience (sig>0.25), construction area (sig>0.25), and reception (sig>0.1). Most behaviors are influenced by variables outside the model.

This supports the research conducted by Fausayana (2014a) that behavior is strongly influenced and determined by the ethnicity habitus that has been attached to

ethnic customs and traditions itself. The seaweed farmers in the Bungin Permai village which majority come from Bajo ethnic, with the habitus that has been embedded and has become a skill.

Fausayana (2014b) stated that, original skills that have been the habitus done since settled in Bungin village and still done until now by Bajo Bungin ethnic are: (1) “Ambai” The catch fishing process using net. The catch target is all types of fish. This fishing model is divided into two groups, namely the group that installs the net and the group that lead the fish, (2) “Ngarempa” (or “meti-meti”), (3) Create a large boat that has been acted since the 1940s, and still received orders, both from ethnic as well as from outside ethnic Bajo and (4) “Waring” and nets.

The results of this study prove and reinforce the results obtained by Fausayana (2015) on the behavior of farmers who are dominated by risk-averse behavior, which occurs because the farmers feel that they have other skills to meet the economic needs of their families, so that when harvest failure farmers will easily take a decision to temporarily stop doing seaweed farming activities.

Conclusions. The explanation of the results and discussion it can be concluded that the behavior of farmers against risk in the Bungin Permai village is only influenced by three socio-economic variables, namely farming experience, construction and acceptance area. Farming experience and construction area will increase farmers' ability to risk, while acceptance will increase farmer's courage to risk.

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