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The role of extension participation on risk taking behavior of local elites and the coffee agroforestry farmer's income: A case study at Social Forest Community on Batutegi Forest Mangement Unit, Lampung Province

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Abstract. The objective of the reserach was to elucidate the role of extension participation on enhancing risk taking behavior of the economic lost of the local elites group as the basic of triggering coffee agroforestry farmer's income beside both social capital and physical capital. The elite, in this study, is difined every one that exhibits 3 charactericts or behavior *i.e.* risk taker talent, leading in coffee agroforest practice, and expressing good performance in coffee bean post harvesting. The research was conducted in July-August 2020 at the at community forest on Batutegi Forest Mangement Unit (BFMU) of Lampung Province. Data collecting were carried out in 4 steps: (i) interviewing the manager of BFMU to find the prior infomation around the probable local elites existed in the community, (ii) validating the probable elites by visting door to door and made observation about their pioneering especially for (ii.a) forest covering performance of their land, (ii.b) post harvesting management of coffee fruit, (c) measuring their talent of risk taking characteristic. The the critrium of the steps (ii.a) was farmers whose land exhibits covering by canopy trimber wood estimated of more than 30%, and the criterium for step (ii.b) the farmer who threats their coffee fruits in post harvesting management according to Indonesian National Standard # 01-2907-2008 that revised based on the Resolution of ICO 407. Having founded both criteria, we then carried out the (iii) measuring risk taking level on economics lost for every local elites group using a modivited guide line of DOSPERT on 3 level of scales: *strong, medium and low*. We got 46 people being recognized as the local elites, besides 77 people who cathagorized non elites. We also collected the data of their participtaion in extension, social capital (*norm, trust, and network*) and the physical capitals (land acreage holding, and motor bike or car ownership). Step (iv) We employed Ordinal Logistic Regression Model to demonstrate the effect of extension to risk taking behavior at confident level of 5 and 10%. We further employed the Ordinary Least Square to examine the role of local elites group, social capital, and physical capital on the [Y_AGFR]. The research suggested that the extension partisipation was the only effective way in enhancing risk taking behavior of economic lost of the local elites [R_ECONM]. The [R_ECONM] could enhance the the coffee agroforestry farmer's income [Y_AGFR] significantly accompanied by their social capital but not by physical capital.



1. Introduction

Since early 2006, Indonesia government has established a scheme for empowering the poor who encroaches the forest called social forest community or HKm (Indonesian term: *Hutan Kemasyarakatan*). Starting 2017, Indonesia has fully implemented the decentralization policy through The Act # 23/2014 about Local Government Autonomy. The consequences on the decentralization implementation of forest management are both positive and negative and occur within the social, economic and ecological aspects of forest resources. The status and development of HKm program in decentralization period is one of the CBFM program of Indonesian government in solving social problems in forestry. In addition, HKm program is the first CBFM program particularly social forestry which implemented in Lampung Province, and now covers the greatest forest area compared to other CBFM programs [1]. This study examines and analyzes HKm as a decentralized forest management program which aims to meet the needs of communities. The status and development of HKm program at a time before and in the transition period of decentralization is an objective of the study because HKm is one of the CBFM program of Indonesian government in solving social problems in forestry. In addition, the HKm program is the first CBFM program implemented in Lampung Province, and now covers the greatest forest area compared to other CBFM programs.

By becoming a member of HKm, forest squater has the right to manage for 35 years by cultivating intercropping non-timber plants (agroforestry) on condition that they are not allowed to cut timber trees, but instead of wood such as honey fruit, rattan, durian, jackfruit, breadfruit, coffee fruit and the like. At the same time, the government has also established a forest management authority at on farm level known as Forest Management Units (FMU). By the end 2019, there are 16 FMU established in Lampung Province, one of them is Batutegi FMU.

The whole of Batutegi FMU's area is protected forest, but now almost of the area have been converted into coffee plantations, covering 27 villages plus 9 villages whose communities have become members of HKm. The area is an export supplier of coffee from Lampung Province. But the people are still poverty. The main cause is inferiority in cultivation techniques, in post-harvest grading, in management including access to credit and international market networks, as a result of which farmers are controlled by pengijon. The FMU authorities face a lack of resources including extension personnel both in quality and quantity. In fact, in the next 15 years, around 25% of HKm holders must release their managed (concession) land. This means that they must have a decent income above subsistence level in order to escape from poverty trap and set out not to be forest squatters anylonger.

There is an imperative strategy for BFMU that have to utilize local elites group who are already adaptive, talent, have strong social capital and even have homophile customs in their community. The elites group must also have a strong entrepreneurial talent to become a pioneer in competition from the on-farm cultivation level to competing as a supplier of export quality coffee. There is not data available to build the scenario for empowering coffee agroforestry community at the BFMU. For this reason we need to carried out research that aimed at building an endogenic model of micro entrepreneurship development by empowering local elites. The model is then intended as the basic for developing scenario of poverty alleviation and escaping the HKm member all at once in order not to be forest squater anylonger.

2. Methods

The research was conducted on 7 July to 4 August 2020 at the at community forest on BFMU of Lampung Province. The resrach location is display on the Figure 1. Data collecting were carried out in 4 steps. The flow chart of the research steps is presented in Figure 1. The step (i) interviewing the manager of BTFU to get infomation around the local elitess existed in the community, (ii) validating the the elitess by visting door to door and made observation about their pioneering especially for (ii.a) forest covering performance of their land, (ii.b) post harvesting management of coffee fruit, (c) intreviewing of their risk taking behavior.

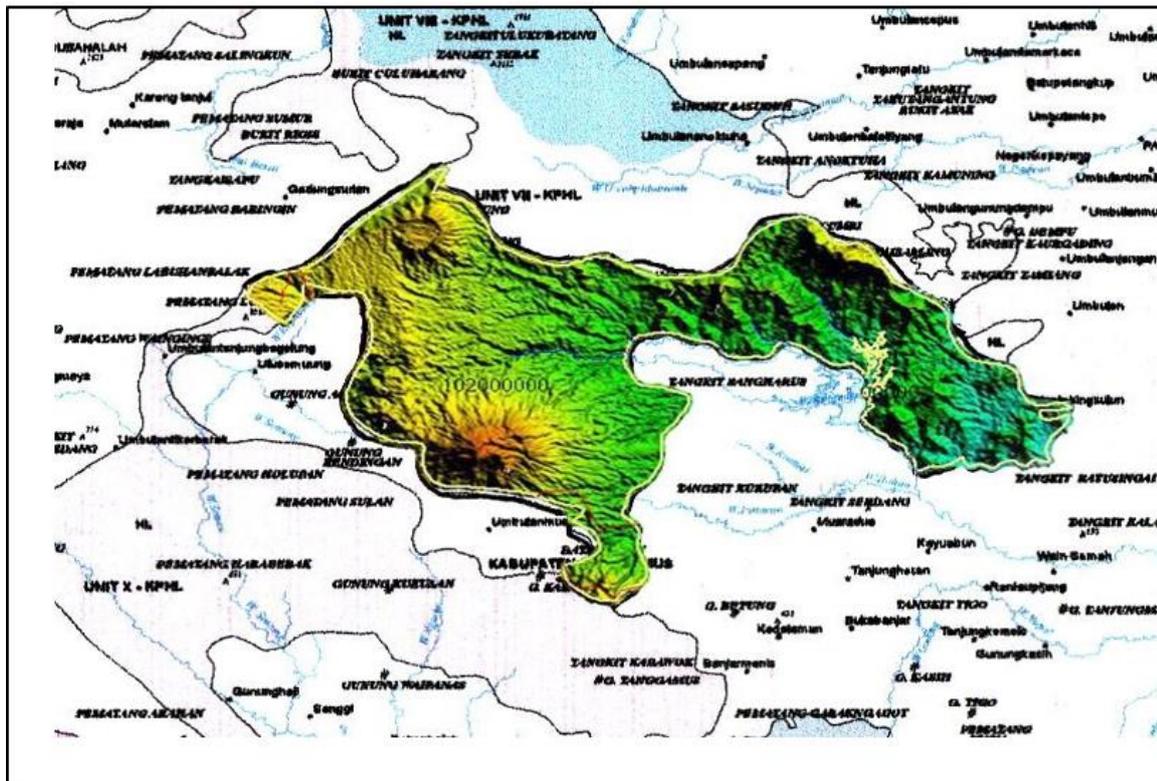


Figure 1. Research Location (After: KPHP Batutegei, 2014)

The the critrium of the steps (ii.a) was farmers whose land exhibits covering by canopy of timber wood estimated of more than 30%, and the criterium for step (ii.b) the farmer who threats their coffee fruits in post harvesting management according to Indonesian National Standard # 01-2907-2008 that revised based on the Resolution of ICO 407. Having founded both criteria, we then carried out the (iii) measuring the level of risk taking level on economics lost for every local elites using a modivited guide line of DOSPERT [2] on 3 level of scales: *strong*, *medium* and *low*. We got 46 people of recognized as the local elitess, besides 77 people who cathagorized non elitess. We also collected the data of their partisiptaion in extention [EXT], social capital (*norm*, *trust*, and *network*) and the physical capitals (land acreage holding, adn motor bike or car ownership). Step (iv) We employed Ordinal Logistic Regression Model to demonstrate the effect of [EXT] to risk taking behavior at confident level of 5 and 10%. We further employed the Ordinary Least Squire to examine the role of local elites group, social capital, and physical capital on the [Y_AGFR].

3. Result and Discussion

3.1 The role of extention partisipation on risk taking behavior

Some simulating work to bulid a model of predicting risk taking behavior using some variables had almost compleetly failed. Only did the extention variabel [EXT] found on the goodness fit model. As expressed int Table 1 the P -value Gald Statistic =0.014. This finding implied that the model was very good to predict the improving risk taking behavior by using the only variable of extension partisipation underwent by the local elitess. This P -value criterium tells us that there will be only 14 miss prediction in case we be utilizing 1,000 data of elites extention partisipation as the solely preditor variable. This is also a parsimoniuous model. Futhermore, the model also tells us that every increasement in extention partisipation 1 event per month, there will be any increasement to be 1.39 as expressed by its Odds Ratio with $P=0.037$ (bellow 5%) of significant level.

Table 1. The role of extension [EXT] variabel on enhancing the risk taking level of elites local of agroforestry community at Batutegi Lampung Province Indonesia

Predictor	Coef	SE Coef	Odds		95% CI	
			Z	P	Ratio	Lower
Const(1)	-2,68271	0,584913	-4,59	0,000		
Const(2)	-0,0558713	0,332224	-0,17	0,866		
[EXT]	0,328650	0,157933	2,08	0,037*	1,39	1,02 1,89

Log-Likelihood = -41,208
 Test that all slopes are zero: G = 6,026, DF = 1, P-value = **0,014***
 Goodness-of-Fit Tests
 Method Chi-Square DF P
 Pearson 16,2804 11 0,131
 Deviance 16,9056 11 0,111
 Measures of Association:
 (Between the Response Variable and Predicted Probabilities)
 Pairs Number Percent Summary Measures
 Concordant 275 44,0 Somers' D 0,29
 Discordant 94 15,0 Goodman-Kruskal Gamma 0,49
 Ties 256 41,0 Kendall's Tau-a 0,17
 Total 625 100,0

Note: *significant at 5%

Base on the Table 1. we can expressed as in the Equation {1} as the predicted model:

$$\ln \frac{(P[EXT]_{i=1})}{1-(P[EXT]_{i-1})} = -2,68271 - 0,0558713 + 0,32865[EXTN]_i$$

In application of this reserach finding, for example, the BFMU should raise the extension events so as to encourage the risk taking behavior againts economic lost [R-ECONM] especially for the local elites of their community of social forestry. The [R_ECONM] variabel is the important behavior to challeng the success possibility almost of kind of business includes the exporting coffee bean from the second biggest center of Batutegi area. To local elites the BFMU can rely on the developod the rural entrepreneurship enhancement, but not on the non elite farmers does. The later are almost impossible of hoping on. The non elites are commonly so bother coping with their daily life of burden, it is not a realistic to hope themin order to take risk that very frequently occur in the business. The success for coffee bean business especially for international market triggered by the local elites, certainly will induce strongly the non elites contribution as the suppliers of coffee beans. It will accompanied by some economic activities across the rural area and ofcourse will leverage faremer's income as whole. This sequent of logic need to be upheld by proving of research data as be can examined in the following.

3.2 The role of elites's risk taking behavior, physical, and social capital on income

In order to know how much do the role of elites's risk taking behavior, physical, and social capital on coffee agroforestry farmers' community income [Y_AGRF] we need to examine the Table 2.

Table 2. Analysis of Variance the role of elites, social adn physical capitals on the income of Batutegi social community forest

Source	DF	SS	MS	F	P
Regression	10		204,047	20,405	26,94 0,000***
Residual Error	108		81,786	0,757	
Total	118		285,833		

Note: *<10%; **<5%; ***<1% of confident level

Table 3 is to express the joined three group of variabels (elites group, risk taking behavior, and both social and physical capitals) affect on the [Y_AGRF]. The $P=0.000$ (as can be equated to 0.0004) tells us that if we using the three group of variables, there will be only 4 miss predicted [Y_AGRF]. It infers that the model is very accuratly in predicting the [Y_AGRF]. In other words, that the role of the three joined as whole is significantly to affect the communy income of this area of community of coffee agroforestry. It is interesting in envestigating further of which elementary variable that affect truely to the [Y_AGRF]. We need to display a proof of the testing parameter model as expresseed in Table 3.

Table 3. Testing paramater model of the coffee agroforetsy farmer's income at Batutegi, Lampung Province

Predictor	Symbol	Coef	SE Coef	T	P
Constant		-0.1492	0,3014	-0.50	0.622
<i>Elite Group's Role</i>	[ELLT] _i	2.1456	0.2049	10.47	0.000***
<i>Risk Taking Behavior</i>	[R_ECN] _i	0.2774	0.1252	2.22	0.029**
<i>Social Capital</i>					
Norm Performance	[NRM] _i	0.2295	0.1239	1.85	0.067*
Trust Level	[TRST] _i	0.2514	0.1101	2.28	0.024**
Network Desity	[NWK] _i	0.1207	0.1072	1.13	0.263
<i>Physical Capital</i>					
Land Forest Holding	[ACR_FRT] _i	0.2068	0.0574	3.60	0.000**
Non Forest Land	[ACR_PRV] _i	0.1390	0.2214	0.63	0.531
Car Ownership	[CAR] _i	-1.0751	0.3224	-3.34	0.001***
Motor Bike Ownership	[MBIKE] _i	-0.1581	0.0986	-1.60	0.112
Phone Ownership	[NMB_HP] _i	0.0316	0.0687	0.46	0.646

$S = 0.870218$ $R\text{-Sq} = 71.4\%$ $R\text{-Sq}(\text{adj}) = 68.7\%$

First of all we need to pay attention to the numbers noted bellow, i.e. Table 3 that are $R\text{-Sq}=71.4\%$ and $R\text{-Sq}(\text{adj})= 68.7\%$. The $R\text{-Sq}$ (coefficient determination of the model obtained) indicate that the as many as 71.4% of the variation of the data of [Y_AGRF] can be explained by the 10 predictor variables above, whereas the remain of 28.6% must be explained by other variables that not included in this model. As for the $R\text{-Sq}(\text{adj})$ is to express the coefficient determination that has been counted on the sample size used in the model. It is important to note that the coefficient determination is not intended as the indicator criterium of the goodness-fit of the model instead the P number in Table 2.

3.3 The Elite Group Role and Their Risk Taking Behavior

We can infer a proof of the role of elites group on leveraging the hold income of the community of coffee agroforest of the study area. As expressed by the parameter of [ELITES] obtained of 2.1456. It is meant that there is diffrence income between elite group around IDR 2.1456 per month above the average income of non elite group. This difference is very significantly at confident level of bellow 1%. In one side the discrepancy is a matter for those who hold utilitarianism prespective. On the other side the elites are commonly have pioneer in some characteristics, they commonly behave as innovator, high risk taking behavior and talent in entrepreneurilaship, and they frequently creates job and other opportunities to generate income for the rural community as well.

For the sake of providing another proof of the elites group's role in enhancing the [Y-AGFR], we need to examine the coefficient of risk taking behaviour against economic lost probability in Table 3, i.e. 0.2774 with $P=0.029$. The P number imply that the role of risk taking behaviour is significantly affect on the [Y_AGRF] because $P<5\%$. As for the coefficient of 0.2774 in the table, it tells us that

every improvement of risk taking level (from low to middle level or from medium to high level) there will be an increase [Y_AGRF] of around IDR 0.2774 million per month. The increase is a significant effect on the [Y_AGRF].

This finding perhaps can support the notion about risk taking behaviour as the leverage variable on the economic activities in the rural area that can be initiated by the enhancing of coffee bean export performance. Risk-taking behavior is defined as the proactive behavior of individuals, taking potential risks for positive organizational or group outcomes, but will have a negative impact on the organization or group if the results are negative [3]. This is because risk-taking behavior is positively related to leadership and commitment to organizational change [4]. This means that the elite group has a spirit of leadership and commitment so that they dare to take risks in entrepreneurship to improve the economy in their village.

3.4 The Social Capital Role on Income

According to [5] social capital is the description of social life to conduct collective actions that enabling every participant to achieve effectively the individual or group objectives all at once. [6] decomposed the social capital element into three subvariable *i.e.* norm, trust, and network. The norm element is the cultural recognition that binding every individual to obey the common values accepted by their group or community both written formally and informally. Social capital in community forest in local level is clearly essential in maintenance and use of the commons therefore needs to be preserved the existence by keeping trust among members of community forest groups [7]. It is very important to recognize the factors and conditions of the social capital which influence development of HKM program in research location. The trust element is feeling sure that some could ignore a kind of risk of losing something. As for the network is the relationship asset that make anyone can develop every relation efficiently.

The role of element of norm variable significantly affects on the [Y_AGRF] as connote by the its coefficient of [NRM] = 0.2295 with P=0.065. Of every increase of one level of norm performance (from low level to medium level or from medium to high level) there will be accompanied the increase in [Y_AGRF] as much as IDR 0.225 million per month per household. The norm can play an important role in every relation or in all kind transaction including the economic transaction motive such as the coffee beans business. According to [8] the norm is the guaranty that everyone who wants to make first relation to any other else. When the first relation success without any little trouble, the relationship tend to be recurrent, even will become reference to other people. It also meant that the trust element will be occurred and planted in the brain. If the accumulation of both the norm and trust rapidly grown, the intensity of the relationship among the people will also rapidly grow so that the network density will be developed as well.

On the had the rapid of network density enhancement will also induce the accumulation both trust and norm effectiveness. As a factor of economic production activities, the thickness of social capital will play an important role in increasing productivity through: (i) reducing transaction costs and will provide allocation of resources, and (ii) reducing rent-seeking and free-rider behaviour, and (iii) encouraging cooperation development plans and increasing performance of institution effectiveness. According to [9] the praxis of development is essentially as institutional-cultural development that shape people to obey all of norm, trust building and to stimulate collaborative and strengthen collective actions.

As could be examine in Table 2, the trust element also points out to have a positive role the [Y_AGRF], *i.e.* the coefficient of the variable =0.2514 with P=0.024. It is meant that every increase of trust performance level (from low to medium level or from medium to high level) there will be occur an increase of [Y_AGRF] by IDR 0.2514 million per month per house hold and this increase is attributed as the significant one as connote by the its P=0.024 (<5%). As the trust element rise up, it will reduce all of kind of transaction cost. The transaction cost is all costs incurred but do not add to income (return). The forms of fees that are included as transaction costs include: information retrieval fee (inspection fee by survey), negotiation fee, arrangement fee, binding fee (contract fee), meeting fee allowance, supervision fee (monitoring), insurance fee, as well as costs of disputes through mediation or through judicial or formal proceedings [10]. In this context, if social

capital is strong (especially if the trust is strong) then all the detailed expenses will be greatly reduced. That is why the allocation of time allocation can be saved. This means that the total cost of production is cheaper and profits will increase. So do this happen in the area of the study when the social capital increase especially both of the norm and trust elements as proven by this study.

3.5 The Role of Physical Capital on Income

The ownership of motor bike [MBIKE] and cellular phone [NMB_HP] also do not affect the [Y_AGRF]. This finding is very contrary to the fact reported by [8] at community forest of Gedongwani Forest Management Unit (GFMU) of Lampung Province. The most possible explanation is caused by the difference of topographical working area. At GFMU is dominantly covered by flat to undulating slopes, whereas at Batutegi by rolling to mountainous slopes areas so the utilization of the vehicle as production factor also different. Because the conditions for building social capital are different in one place and will be graded in line with economic differences [11], [12], [13]. Besides that social pressure is influenced by strong norms, intentions, control and adoption by other farmers and will spur farmers to obtain and create social capital, so that farmers will incorporate new technology into their activities. This result will increase self-confidence (Castillo *et al.*, 2020). Besides the good accessibility to Bandar Lampung capital city, the location of GFMU is very close than that of BFMU that [MBIKE] more productive asset for community forest of GFMU. It is also interesting in examining the role of car ownership [CAR] variable. Every addition of car ownership will decrease the [Y_AGRF] significantly. It implied that car is not productive asset for business of coffee agroforest in the area of study.

Additionally, this research also reveals that every 1 ha addition to the farmer, the [Y_AGRF] will increase as much as IDR 0.2068 millions per month per household. This increase is lower than those of the effect of social capital *i.e.* both for norm or trust elements. The phenomenon strengthens the proof that social capital could be more effective in enhancement of average income in agroforestry community than that of physical capital. Same with that social capital is more influential on the income of community in Uganda and is supported by a good environment, then financial capital has an impact after social capital because it is used as capital for development [14]. In that case social capital structurally and cognitively affects the business opportunities owned by farmers. The higher the education, the higher the business opportunities that will be encountered [15]. The same phenomenon also founded by [7] in the forest area of Gedongwani of Lampung Province. Among the 5 physical capitals evaluated in this study only did the land holding acreage in state forest area [ACR_FRT] can increase the [Y_AGRF] very significantly ($P=0.000$). Whereas the addition land private acreage is not significantly effect the [Y_AGRF] even though cultivated as coffee agroforestry as well. This finding implied that in general the social capital is more effective in endeavour of [Y_AGR] than that of physical capitals. According [16] proactive in social interaction between entrepreneurs who need external networks will improve the quality of the relationship with the company's performance.

Overall the finding we can predict the [Y_AGRF] based upon the 10 variables accurately by using the Equation {2} as the following:

The regression equation is

$$\begin{aligned} [Y_AGRF] = & - 0,149 + 2,15 [ELLT] + 0,229 [NRM] + 0,251 [TRST] + 0,121 [NWK] \\ & + 0,277 [R_ECN] + 0,207 [ACR_F] + 0,139 [ACR_PRV] - 1,08 [CAR] \\ & - 0,158 [MBIKE] + 0,0316 [NMB_HP] \end{aligned}$$

4. Conclusion

This research result revealed that: (1) Risk taking level of local elites could be increased significantly by the single variable of extension participation enhancement, (2) income increase of the coffee agroforest community can be leveraged by: (a) the role of local elites group and their risk taking behavior enhancement, and (b) physical and social capital but the later variable more effectively way than that of the first. It recommend that conduct research to elaborate the other variables of such as accessibility, role of multi ethnical, and rural credit etc.

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