

Community Adaptive Readiness for Ecological Changes from Agriculture to Mining in Bombana Regency

Syafuruddin¹, Sumardjo², Prabowo Tjitropranoto³, Anna Fatchiya⁴

¹Study Program of Development Extension

^{2,3,4}Lecturer of Bogor Agriculture University, Bogor 16680, Indonesia

Abstract: Ecological changes from agriculture to mining have not been followed by the readiness (adaptive competency) of the people in Bombana Regency to deal with them. Community adaptive readiness is indispensable since mining is a new thing for the people who have been farmers and fishermen. This study aimed to: (1) analyze the level of adaptive competency of the communities around the mining areas in Bombana Regency, and (2) analyze the factors that influenced the level of adaptive competency of the communities around the mining areas in Bombana Regency. The research method used was survey method and the data analysis was carried out descriptively and inferentially. Inferential statistical tests used a multiple linear regression. The results of the study showed that the level of adaptive competency of the communities around mining areas in Bombana Regency was in the reactive category, including technical capability (reactive), professional transfer ability (pro-active), and the ability to take advantage of available opportunities (pro-active). Internal factors that influenced the level of community adaptive competency were the levels of education, motivation, perception of empowerment by the company, participation, and community perception of mining ecology. External factors that influenced the community adaptive competency were counseling support, social environment support, institutional support and communication support. Social conflicts had a significant effect on the community adaptive competency, namely the process of natural resource occupation and the handling of negative impacts.

Keywords: Ecological adaptation, community readiness

1. Introduction

The socio-economic conditions of the communities around the mining areas in Bombana Regency seem to be left behind with a high level of poverty. This indicates that the adaptive competency of the communities is not sufficient to respond to environmental changes due to the presence of mining companies operating around them. According to the Southeast Sulawesi Statistics Center (2015), the poverty level of Bombana Regency was still above the national average (14.28 percent). Hafid (2015) noted that the communities around the mining areas had limited abilities and skills, making them find it difficult to participate in the development activities or to respond to environmental, economic and social changes occurring around them.

According to Sumardjo (2014), the lack of the community empowerment to face changes in the environment makes the communities unable to adapt well to the changing ecosystem. This community powerlessness can lead to an increasingly widespread gap between one community and other communities, between the community and the parties that are part of large companies, which in turn can lead to prolonged social conflicts.

Sumardjo (2016) suggests that there are four levels of adaptive attitudes, namely static / apathetic, reactive, pro-active, and anticipatory. Apathetic is the lowest level of the community adaptive attitude, while anticipatory is the highest adaptive level. The adaptive levels are presented in Figure 1.

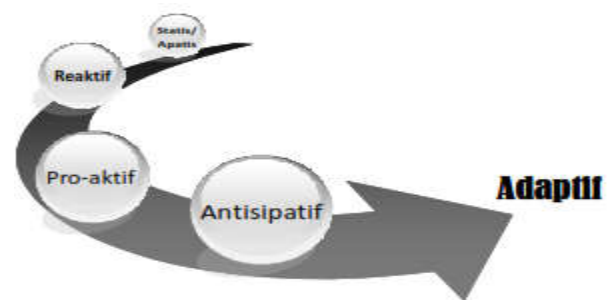


Figure 1: Attitudes in adapting (Sumardjo 2016)

A community grows and develops from those being characterized by subsistence or apathetic to those empowered, and to the highest level of maturity or adaptation if the community is independent. People who have adaptive characteristics are able to anticipate and face their future (Sumardjo 2017).

Lawson and Kern (2010) describes a competency as having three components: knowledge, understanding and critical awareness. A good community makes information as a center stage for community empowerment. Relevant information enables the community not only to know something that is happening, but it also allows people to have an involvement or role in an activity. In addition, the community also needs to have an understanding related to language, parameters and technical constraints so that they can make convincing arguments about their wishes. Furthermore, if people understand their position, they may be more capable of being critical, reflective and pragmatic about where they want to be and how they want to get there.

An important aspect of competency to support the realization of an empowered community according to Lord and Hutchison (1993) is personal control that individuals have the freedom to choose alternatives in their lives. In line with this, Triantafyllou and Nielsen (2001) reveal that the concept of competency in the context of empowerment is an attempt to make individuals independent and responsible. Related to this idea, Salge et al. (2014) state that cognitive function produces ideas based on behavior so that individuals are able to act to improve or increase their power.

Efforts to develop communities around the mining areas in Bombana Regency have been regulated in the regional regulation Number 14 of 2012 concerning mineral and coal mining. There is also a regional regulation of Southeast Sulawesi Province Number 5 of 2013 concerning the management of mineral and coal mining. The two regulations clearly stipulate the obligation of mining companies to carry out community development activities with prioritization of the people who are close and directly affected, without distinguishing regional administrative boundaries.

The study by Shambodo et al (2015) show that Bombana Regency has formulated a strategic program to improve capacity and strengthen community capacity in order to reduce regional poverty. However, at the level of implementation, the program has not been the focus of development activities. Although there has been an effort in that direction, in reality the initiative has not been realized.

Mining exploitation by mining companies in Bombana Regency has begun since 2005. Mining sites are spreading in several districts. Exploitation sites are close to residential areas, but some are quite far from the settlement. This study aimed to (1) analyze the level of adaptive competency of the communities around the mining sites in Bombana Regency, and (2) analyze the factors that influence the level of adaptive competency of the communities around the mining areas in Bombana Regency.

2. Research Methods

The study, conducted in Bombana District, Southeast Sulawesi Province, was designed with a descriptive survey method. The territory of Bombana Regency consists of land and islands. Mining companies operate in these two regions. The research population included the household heads who live in the villages around the mining areas, both on land and on the islands and they are the beneficiaries of the empowerment program, both carried out by the government and by mining companies.

Determination of the sample was done by a proportional cluster sampling technique. The cluster was determined based on the areas where the CSR programs of the companies are implemented, which is divided into three rings: Ring 1 is the areas that are directly affected by mining activities. Ring 2 is the areas that are indirectly affected by mining activities. Ring 3 is the areas that are not affected, but they are transportation routes necessary for the mining

companies. The total study sample was 182, which was determined proportionally.

The data analysis was carried out quantitatively with the support of qualitative data. Statistical analysis was performed using descriptive statistics and inferential statistics. Inferential statistical tests were used to analyze the influence between dependent variables and independent variables using a multiple linear regression analysis with a program of SPSS version 18.

3. Results and Discussion

Changes in the ecological hue of the communities from agriculture (22.63%) to mining have reduced the total area to 20.09%. The impact of these ecological changes turned out to be less followed by the readiness of the communities to adapt. Adaptability is measured by adaptive competency.

Level of Community Adaptive Competency around the Mining areas

Overall, the level of adaptive competency of the communities around the mining sites was in the reactive category and there was no difference in adaptive competency of the people living on land and on the islands (Table 1).

Table 1: Distribution of the levels of adaptive readiness of the communities around the mining areas.

Adaptive Competency	Category	Location		Total (%)	Coefficient of difference test (t-count)*
		Island (%)	Land (%)		
Technical Competency (Avarage score = 30.90)	static / apathetic	15.40	18.70	34.10	0.39
	Reactive	13.20	14.30	27.50	
	Pro-active	11.00	10.40	21.40	
	Anticipatory	8.20	8.80	17.00	
Profession Transfer Competency (Avarage score = 51.90)	static / apathetic	9.90	15.90	25.80	0.83
	Reactive	18.10	19.80	37.90	
	Pro-active	18.10	14.30	32.40	
	Anticipatory	1.60	2.20	3.80	
Competency in taking available opportunities (Avarage score = 51.70)	static / apathetic	17.00	8.80	25.80	0.21
	Reactive	16.50	27.50	44.00	
	Pro-active	9.30	10.40	19.80	
	Anticipatory	4.90	5.50	10.40	
Adaptive Competency (Avarage score = 44.83)	static / apathetic	58.60	53.70	56.00	0.88
	Reactive	28.70	24.20	26.40	
	Pro-active	5.70	17.90	12.10	
	Anticipatory	6.90	4.20	5.50	

*t_{Table} α 0.05 = 1.980; α 0.01 = 2.617

Note: static / apathetic= 0–25.00; Reactive= 25.01–50.00 Proactive= 50.01–75.00; Anticipatory= 75.01–100

Based on Table 1, the level of adaptive competency from the aspect of technical ability shows that the majority of the people were in the static / apathetic category where there was no difference between the people on the land area and on the islands. Observations at the study sites indicated that the communities’ understanding of empowerment programs was still poor, especially in activities held by the private sector, so that, technically, the communities still had

difficulties in designing programs that could be supported by mining companies operating around them. In the meantime, the empowerment program carried out by the local government has led to the growth of participation, as seen in the *musreimbang* activities (development planning meetings) held by the government which involved the communities in planning. However, the communities considered that *musreimbang* activities were only a formality because there was no follow-up of the proposals submitted.

The ability to transfer professions and to take advantage of available opportunities showed that the majority of people were in the pro-active category, there was no difference between the people living on land and on the islands. This shows that the communities around the mining areas in Bombana Regency had not been able to anticipate drastic and rapid changes, making them find it difficult to pursue other kinds of work, not to mention developing new businesses which are not in the field of agriculture and plantation. Mining companies together with the local government must pay attention to the limited capacity of the communities in the empowerment program that is carried out so that the program design can include active participation that encourages the ability of the communities in every empowerment activity undertaken. Adaptive competency of the community is an important aspect in terms of human resources, so that, according to Rayahu (2014), in each development program it is necessary to have human resources with initiative, knowledge and skills to understand problems and solve them.

Influence of Internal Factors on Adaptive Competency Levels of the Communities around the Mining areas

The analysis results of the influence of internal factors on the level of adaptive competency of the communities around the mining areas are presented in Table 2.

Table 2: Regression coefficients of the internal factors on the level of adaptive competency of the communities around the mining areas

Internal Factor	Regression coefficients of the internal factors on the level of community adaptive competency (t-count)*
Age	1.59
Level of education	7.23**
Frequency of training	1.93
Motivation	11.34**
Number of family burdens	1.35
Perception of mining	2.04*
Perception of empowerment by company	3.00**
Participation	5.55**

* $t_{Table\alpha 0.05} = 1.980$; $\alpha 0.01 = 2.617$

Note: ** very significant on $\alpha \leq 0.01$; *significant in $\alpha \leq 0.05$

Based on the analysis results of the influence of internal factors on the level of adaptive competency (Table 2), the internal factors that had a very significant effect on the level of community adaptive competency were education, motivation, perception of empowerment by the companies, and participation. Meanwhile, the perception of mining had

a significant effect on the level of community adaptive competency.

The level of public education can describe the potential of human resources. Although the level of education in the research site was mostly medium, but it could provide influence to develop abilities in empowerment activities. Education provides knowledge, abilities, and insights to individuals so that they can understand and make decisions about the problems they faced, both in personal, group and community lives. Mosher (1987) stated that formal education accelerated the learning process, provided knowledge, skills and the skills needed in society. In line with this opinion, Slamet (2003) reveals that changes in behavior caused by educational activities are: (1) changes in knowledge or things that are known; (2) changes in skills or habits in doing things; and (3) changes in mental attitudes or everything that is felt.

Motivation is needed to encourage individuals to carry out an activity. Motivation of the communities around the mining sites had a good influence on the community adaptive competencies. This means that the communities around the mining areas had a business motivation that encouraged them to always improve their ability to continue to grow so that they are able to overcome the problems they faced to meet their needs. Slamet (2003) suggests that basic human needs can be a powerful source of motivation to encourage farmers to learn something new, which is different from something that has become their habit. People will learn or try to change their own behavior if they know that by learning they can meet with basic needs.

Some communities around the mining areas assessed that mining companies provided less benefits to them and had a negative impact on the environment. However, others could accept the presence of the mining companies. In fact, people's perceptions of mining can be a trigger for increased adaptability. This is due to the challenge to adjust the needs and changes that occur owing to the operation of the mining companies around them. Even though the community perceived mining companies as damaging to the environment, they could not deny the presence or operation of the companies. Therefore, for the communities, the positive thing to do is to keep improving their abilities to follow the changes occurring around them. Robbins (1994) describes perception in relation to the environment as a process of individuals organizing and interpreting the impression of their senses to give meaning to their environment.

Community empowerment carried out by mining companies is more directed towards infrastructure improvements and cash assistance, not yet directed at increasing human resource capacity. However, the analysis results showed that the influence of perceptions on empowerment carried out by the companies with a level of community adaptive competency was very significant (Table 2). This means that the perception of the communities around the mining areas towards the empowerment program carried out by the companies had a strong impact on the community adaptive competency. Funding assistance and infrastructure improvement in the form of roads, bridges and worship

facilities known to the public as CSR (corporate social responsibility) triggered communities to improve their living conditions. Programs that are run by companies, even though they have not touched the realm of increasing human resources, with the improvement of infrastructure, can improve mobility and accessibility of the community. Sumardjo et al. (2014) states that awareness about CSR needs has become a global trend. Many models and patterns of CSR implementation have been developed and implemented by domestic and foreign companies—some being charity-based or philanthropy-based, and others empowerment-based.

The level of community participation around the mining areas in empowerment programs, both organized by the government and the private sector, had a very significant effect on the level of community adaptive competency (Table 2). This means that participation had a strong positive impact on the level of personal ability of the community. However, the fact at the research sites showed that the level of participation in empowerment activities was still lacking, mainly due to the lack of empowerment programs carried out by both the government and the private sector that were designed so that the community could participate. Private empowerment activities were more directed at physical development and cash assistance. In the implementation process, only local village officials were involved. These conditions reduced the opportunity for community members to participate. Even worse, sometimes some residents were not aware of the program being implemented by the companies. According to Sumardjo (2014), several factors that could cause community not (not yet) to actively participated in community empowerment efforts in the context of CSR implementation are: (1) maybe the people do not know the ins and outs of CSR programs, and this ignorance causes no opportunity to participate; (2) the community members concerned do not know the benefits of CSR programs so that they do not have the will (are not interested) to actively participate. Or, even if they know about CSR programs, when the programs are not in line with their life values, they are not interested to join. They may even reject or oppose the programs; and (3) the community members do not have the ability to get involved in CSR programs that are developed, for example, because they do not have adequate skills as well as access due to such factors as time, energy, facilities or funds.

Influence of External Factors on Adaptive Competency Levels of the Communities around the Mining Areas

Based on the results of regression analysis (Table 3), external factors which include counseling support, institutional support, social environment support, and communication support, had significant and very significant effects on the level of the community adaptive competency.

Table 2: Regression coefficient of external factors on the level of community adaptive competencies of the communities around the mining areas

External Factor	Regression coefficient of the level of community adaptive competencies (t-count)#
Support of extension	3.76**
Support of institution	2.45*
Support of social environment	0.19**
Support of communication	0.30**

#t_{Table} α 0.05 = 1.98; α 0.01 = 2.61

Note: ** very significant on α ≤ 0.01; *significant in α ≤ 0.05

Extension support encouraged the improvement of adaptive competencies of the communities around the mining areas. The analysis results in Table 3 suggest that extension support must be considered in an effort to improve the community members' adaptive competency in understanding their problems and potential so that they can improve their life quality. Counseling basically provides an understanding for the community to change their behavior in order to achieve a better life, not only in their cognitive abilities but also in the affective and conative aspects. Sumardjo (2010) states that counseling is basically an effort to improve the quality of individual behavior, which includes cognitive, affective, and psychomotor / conative so that they have individuality (human capital, not individualistic) that is ready to realize the welfare of their families and community.

Institutional support had a significant effect on the community adaptive competencies since it encouraged increased ability, especially the ability to take advantage of available opportunities and the ability to transfer professions. Although the existence and activities of community institutions in the research sites was still minimal, it was sufficient to contribute to the improvement of community capacity, especially in non-technical aspects. Local institutions that were felt to be sufficient to provide assistance to the community were cooperatives and farmer groups. Cooperatives played a role in providing funding assistance to the community through loan funds. Meanwhile, the farmer group was more instrumental in helping the community on technical matters, especially agriculture. Rich and Stoker (2010) stated that local institutions could be relied upon to obtain effective collaborative empowerment governance.

Social environment support was very important for the community's efforts to realize a better life. A conducive social environment made it easy for people to move around and conduct business activities without fear of security problems. Likewise in everyday social life, social awareness realized solidarity among the community so that they help one another in time of difficulty. The analysis results (Table 3) show that the support of the social environment had a very significant effect on the level of the community adaptive competency. Regarding the support of the social environment, Fischer (2006) states that in the context of empowerment, it is important to understand socio-cultural practices that give meaning to spaces for social actors in them. Slamet (2003) reveals that dynamic social relations

relate to the relationships between people, between human groups, and between people and human groups.

Communication support had a very significant effect on the level of competency. Communication support was in the form of the ease of expressing opinions related to empowerment, level of availability and information disclosure. Communities could improve their competencies in connection with the existence of communication support. In addition, the ease of communication with implementers of empowerment programs was also able to encourage the improvement of community Competency. Effendy (2005) suggests that communication is the process of conveying one's thoughts or feelings (communicator) to others (communicants). The thoughts can be in the form of ideas, information, opinions and so forth, which arise from his mind. In the context of empowerment, the communication process becomes an important factor for the community to build a good understanding so that the designed program can be carried out in a participatory manner.

Influence of Social Conflicts on Adaptive Competency Levels of the Communities around the Mining Areas

The data used for the purposes of analyzing social conflict variables had been adjusted to be positive. The analysis results of the influence of social conflicts on the level of adaptive competency of the communities around the mining (Table 4) showed that the occupational process of natural resources had a very significant effect on the community adaptive competencies. This means that the lower the conflict in the occupational process of natural resources, the higher the ability to adapt. Conflicts in the occupational processes could be avoided by approaching the community members, encouraging them to play a role in the land acquisition processes without pressure and compulsion. Community involvement from the outset could be an entry point for companies to design further programs related to the communities.

Table 3: Effects of social conflicts on the level of adaptive competencies of the communities around the mining areas

Social Conflict	Regression coefficient of the level of community adaptive competencies (t-count)#
Occupational process of natural resources	0.61**
Company domination on natural resources	0.10
Handling negative impacts	0.47**

$t_{Table} \alpha 0.05 = 1.98; \alpha 0.01 = 2.61$

Note: ** very significant on $\alpha \leq 0.01$; *significant in $\alpha \leq 0.05$

Handling negative impacts had a significant effect on the level of the community adaptive competency. This means that the better the handling of negative impacts is carried out by the companies, the higher the adaptability level of the communities around the mining. Mining processing has a negative impact which is quite damaging for both the physical and social environment, especially public health. Conflicts due to negative impacts can disrupt both parties, both the community and the company. Mutual beneficial relationships can be built by managing the negative impacts

caused by mining operations, for example, by involving the community in planning and implementing actions to deal with negative impacts. Conflicts that have occurred in the mining areas so far represent economic injustice and access to resources experienced by the surrounding communities. The community members considered that the exploration areas were their traditional territory or hometown. The company, on the other hand, considering the authority it received through mining permits, felt that it had the right to carry out exploration as much as possible for its own economic interests. This asymmetric interest had the potential to become conflicts that had an adverse effect on all parties. The management of potential conflicts in the mining environment has been influenced by three main actors, namely companies, communities around the mining areas and government (Sumardjo 2015). Tetreault's research results (2015) showed that there were two things that might cause conflict in the mining areas: first, the taking over of public resources in the form of mining minerals by companies or outside parties, and second, the removal of small farmers and indigenous peoples from their cultural, water and land life.

4. Conclusion

The level of adaptive competency of the communities around the mining areas in Bombana Regency was in the reactive category, including the technical (reactive) capability, professional transfer capability (pro-active), and the ability to take advantage of available opportunities (pro-active).

Community adaptive competency was influenced by the following factors; namely, the level of education, motivation, perception of empowerment by the company, perception of mining, participation, counseling support, social environment support, institutional support, communication support, natural resource occupation processes, and handling of negative impacts.

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