

Research Article

Traditional oil miners reach their prosperity: an assessment of social welfare in Wonocolo, Indonesia

Yeti Ulfah Tuzyahroya, S. Sariffuddin *

Department of Urban and Regional Planning, Faculty of Engineering, Universitas Diponegoro, Jl. Prof H. Soedarto, Tembalang, Semarang 50275, Indonesia

*corresponding author: sariffuddin@live.undip.ac.id

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Abstract: The purpose of this research was to determine the traditional oil and gas mining community welfare in Wonocolo, Kedewan, Bojonegoro. Welfare hierarchy will explain about needs fulfilment which is needed by the development planning process. The research used a mixed-method which is the result of scoring by quantitative analysis validated by the description of qualitative data. The results of this research indicated that the welfare hierarchy of the traditional oil and gas mining community in Wonocolo is in the ultimate means to intermediate means level, which means they are in low welfare hierarchy. It is shown by the community that still prioritized physiological needs fulfilment rather than self-development necessity. On the other hand, the fulfilment of basic needs taken from nature in Wonocolo is also vulnerable because the water and air are polluted by oil. In addition, the nature of oil that is non-renewable and unsustainable causes an economic vulnerability in Wonocolo community.

Keywords: *needs fulfilment, traditional miners, welfare*

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Introduction

Oil and gas are renewable strategic natural resources owned by the country and is also a vital commodity for community welfare. Thus, it has a significant role in economics so that its management has to bring maximum benefits for community prosperity and welfare (Law No 22 the Year 2011). Mining is then considered as the contributor for social sustainability through the improvement of economic growth, job field and skill. The development has to give impact on the improvement of welfare in economic, social, physical and environment aspect (Spieler, 1993; Sugiri and Adiputra, 2011). According to Naumi and Trilaksana (2015) and Loe and Kelman (2016), mining activities lead to the provision of local job, income improvement, poverty degradation, and prevention of urbanization level in a smaller scale. Besides, traditional mining done by the community serves as the motor of economic growth of regional

development, especially as a multiplier effect on the community (Naylor, 2004; Naumi and Trilaksana, 2015).

In Indonesia, there are oil and gas mining areas that are managed in a modern or traditional way. Wonocolo Village, Bojonegoro is an area in which mining is managed traditionally. Naumi and Trilaksana (2015) explain that the mining activities in old wells have been done by the community of Wonocolo since 1942 and become their main livelihood. Almost all community in Wonocolo Village work as miner through generations. Those who work as miners will bequeath their well to their children. This hereditary work is maintained collectively, and they will communally look for new wells if the old ones are no longer producing oil. Job as a miner is preferable for the community compared to a farmer. Yet, the miners concern the high cost of opening old well, high risk of the mining business, and the threat of production failure since no one can guarantee that they can

find oil from the old well while the cost to open old well is relatively high (Rochmaningrum, 2012).

Mining is expected to boost the growth of local community welfare. However, it does not impact the surrounding community. The concept of welfare explains the need for a human to obtain food, shelter, care, medication and education (Miranne, 1998; Knudsen, 2015; Mayadas, 2016). There are contributing aspects to welfare with a different portion that is put in sequence (Banerjee and Banik, 2018), which are economic/viability (man, social aspect/livability (society) and environment aspect/sustainability (nature, shell and network) (Sariffuddin and Susanti, 2011). Meanwhile, according to Demirbağ et al. (2017), life quality is determined from psychology, physical, social, economic and satisfaction from both personal and social community aspect. Life quality is assessed based on the welfare of the community (Lim et al., 1999).

Wonocolo Village is an oil-rich area in which community is supposed to be wealthy, yet in reality, the community cannot enjoy the available natural resources (Fauziha, 2019). BPS (Statistical Bureau) of Bojonegoro Regency in its explanation on ESDM (energy and mineral resources) of Bojonegoro Regency (2015) mentions that the economic growth of Kedewan Sub-district without gas and oil was 0% which means that there was no improvement. With gas and oil resource, economic growth decreased to 1.19%. In 2015, the poverty line even increased to 15.71% from 15.48% in 2014. As a result, Bojonegoro Regency was listed as the 9th poorest regency out of 29 regencies and 9 cities in East Java.

The community in Wonocolo is highly dependent on mining. Unfortunately, the community is not the owner of the oil well; instead, they work as a group of miners and earn a relatively low wage. Besides, they still do traditional mining with simple equipment. The low wage of the miners in Wonocolo is hardly able to change their profession to own their well. The community depends on the investors, KUD (village cooperative) to PT Pertamina that determines the selling price. Based on the above problems, this research was aimed to answer the question “What is the welfare level of the traditional oil and gas mining community in Wonocolo Village, Kedewan Sub-district, Bojonegoro Regency?”

Research on the poverty of the mining community in Wonocolo was previously done by Fauziha (2019). In her research, she was found out that the community in Wonocolo was considered to have absolute poverty and that they were not wealthy. Internal and external factors contributing to poverty were also discussed in the research. The research, however, discussed the community

welfare level in Wonocolo that were categorized into four levels based on the theory from Meadows (1998) that were ultimate means, intermediate means, intermediate ends and ultimate ends. Therefore, this research is expected to complete the previous research to become a lesson for any further research.

Research Methods

The principle of this research is to find out the welfare level of the mining community in Wonocolo. The method used was a mixed method by combining qualitative and quantitative methods. The design used for this method was validating quantitative data model. This method design included quantitative and qualitative data collection. These data were then analyzed, in which the result of quantitative analysis would be validated by qualitative data (Creswell and Clark, 2011; Agyaputeri and Rahayu, 2017). This research was aimed to see the level of community welfare in Wonocolo according to a theory proposed by Meadows (1998) through Daly triangle. The data used in this research were primary and secondary data. The primary data were collected from field survey (questionnaire), interview, observation and documentation. The secondary data were collected from related institutions that were KUD Sumber Pangan, Kantor Desa (Village Office) Wonocolo, Bappeda (Regional Development Planning Agency) Bojonegoro Regency, BPS of Bojonegoro Regency, and ESDM of Bojonegoro Regency. The sample was collected using non-probability sampling. This approach was used because not all families had the same opportunities to be the sample due to the sample priority, which was the oil and gas miners in Wonocolo. The formula to determine the sample was based on Slovin (Jannah et al., 2014) as follows:

$$n = \frac{N}{1 + (N \times e^2)}$$

$$n = \frac{312}{1 + (312 \times 0.10^2)}$$

$$n = 76 \text{ households}$$

Note:

- N = Population in the research area
- n = Sample
- e = Level of sampling error

The sample used in this research was the total population of households since the calculated welfare was at the level of the household. The

average number of household members working in Wonocolo Village mining was four people. The error tolerance to the sample was 10%. Based on the calculation, the total sample was 75.728 people. The total number of the family was supposed to be an integer, so the total households used as sample were 75 households. The sample was the respondent from one of the family members, especially the head of a family in which one respondent represented one household; therefore, 75 respondents represented 75 different households. The score was applied to each indicator of research variable. The highest score was 3 (three) while the lowest was 1. The score

range was obtained from the calculation of the highest and lowest score after they were divided into three classes. A more explicit calculation is described in Table 1. The determination of the number of category in each variable was based on the number of indicators calculated with Sturges formula as follow (Harinaldi, 2005):

$$K = 1 + 3.3 \log N$$

Note:

K = Number of class

N = Number of variable/indicators

Table 1. Score range in each variable of welfare level in Wonocolo.

Variable	Determination of Score Range	Score Range
Fulfilment of Natural Resources	$K = 1 + 3.3 \log N$	Fulfilled= >11
	$K = 1 + 3.3 \log 3$	Less fulfilled= 8-11
	$K = 1 + 3.3 (0.477)$	Not fulfilled= <8
	$K = 2.6 \approx 3$	
	Highest score (a) = 15 Lowest score (b) = 5 interval= (a-b)/3= 3	
Fulfilment of Development Capital and Human Resource	$K = 1 + 3.3 \log N$	Fulfilled= >14
	$K = 1 + 3.3 \log 5$	Less fulfilled= 10-14
	$K = 1 + 3.3 (0.699)$	Not fulfilled= <10
	$K = 3.3 \approx 3$	
	Highest score (a) = 18 Lowest score (b) = 6 interval= (a-b)/3= 4	
Fulfilment of Human Resource and Social Capital	$K = 1 + 3.3 \log N$	Fulfilled= >21
	$K = 1 + 3.3 \log 4$	Less fulfilled= 15-21
	$K = 1 + 3.3 (0.602)$	Not fulfilled= <15
	$K = 3.0 \approx 3$	
	Highest score (a) = 27 Lowest score (b) = 9 interval= (a-b)/3= 6	
Happiness	$K = 1 + 3.3 \log N$	Fulfilled= >10
	$K = 1 + 3.3 \log 3$	Less fulfilled=7-10
	$K = 1 + 3.3 (0.477)$	Not fulfilled= <7
	$K = 2.6 \approx 3$	
	Highest score (a) = 12 Lowest score (b) = 4 interval= (a-b)/3= 3	

Results and Discussion

Fulfilment of natural resources

Illegal oil and gas source. The source of oil managed by the traditional mining community in Wonocolo is obtained through two types of wells that are new and old wells. Old wells are those

drilled before 1970 and produce the oil. These wells are also located on a field that is not included in any Working Field bounded by cooperation contract and is not used anymore to do business by the contractor (Minister of Energy and Mineral Sources, 2008). In this study, a contractor is referred to Pertamina EP which has cooperation

with KUD Sumber Pangan and BUMD. Any construction for new wells requires the contractor permit that is PT Pertamina EP. Nowadays, there are many cases in which new wells are constructed without any permission from the contractor. It meant that the produced oil comes from illegal wells. The community practice this is because of the limitation set by the government through regulations, which also impede economic growth. Therefore, law violation in the name of economic needs is common.

Threatened air and water fulfilment

The need for well-flowed water during the rainy season in settlement area is different from one in the mining area and during the dry season. The air quality is different in the mining area and settlement area. Mining area has poor water quality and lack of quantity. There is a tourism area that is being developed. Meanwhile, the community in Wonocolo consider that water and air fulfilment is not a problem in their environment. This means that the community assess this fulfilment within individual level instead of a larger community. Besides, It also has a sense of belonging and involvement to the management of Tourism Area of Teksas Wonocolo.

Natural resources fulfilment method

Based on the variables in fulfilling the natural resources that include clean water, clean air and safety from a natural disaster, the community needs are categorized as fulfilled. The community intervene in the fulfilment of the needed clean water, clean air and safety from a natural disaster. For the fulfilment of clean water, for example, the community use a water pump to take out the water. Besides, there is community innovation during the dry season in which the community change the water resource from well water to water depot, although it has a higher cost.

Community assessment on environmental safety is affected by the house location. There are three types of community in assessing the safety of their environment. Firstly, the community whose house is located in a flat and sloping area and far from a mining well. There are 68% community categorized into this type. The community residing in this location consider that their environment is safe. Secondly, the community that leaves in a rather steep zone or close to a non-hardened cliff. There are 31% community categorized into this type. Thirdly, a community that has been victims of landslides, or communities that has a house near the location of old wells. There are 1% community categorized into this type. The community consider that natural disaster that has happened is not one to

be worried and is not unusual since landslide and fire rarely occur.

The fulfilment of development capital and human resources

The development of production tools

Since 1987, human-powered oil extraction is replaced with an engine of used car. The use of engine fasten the oil extraction but decrease production. The community admit that the problem is now the less amount of production compared to the past. It is a common consequence as hundreds of wells have been exploited. The extraction is done quickly with a great amount of production. As a result, the oil resources are depleted, and its sustainability is in jeopardy.

Independent efforts by the miners

The miners in Wonocolo are “self-help” miners who strive by having initiatives without any intervention from other parties such as government or Pertamina. One of the efforts in developing the working equipment from human-powered into machine-powered tool though it still needs human power. The struggle in the economic aspect is made through the selling system outside Pertamina, although it is illegal. The miners also apply internal agreement among each group upon the working hours. The working hours are varied; there are even some that work for 24 hours by shifting it. In this case, miners work as Pertamina “robots” that work all time without any direct assistance of the need of work safety and health as well as environmental sustainability, since these aspects become the responsibility of KUD.

Based on the variables in fulfilling the development of capital and human resources that included workers, work equipment and mobilization, the community needs were categorized as less fulfilled. This statement is supported by the limited capacity of the community so that their efforts to fulfil development capital and human resources are accordingly limited. The community do self-fulfilment on the need for equipment, miners, and transportation mode to support their economic activities. There is no subsidy to provide mining and safety equipment to help the miners in the production process.

The government is limited to stipulate the regulation but is less interested in finding the impacts of the regulation on the community. Meanwhile, Pertamina, as a contractor, receives the result without supporting the process. It is due to the regulation that the responsibility of procurement is under KUD as regulated in the Minister of Energy and Mineral Sources Regulation Number 01 the Year 2008. Therefore,

the managing KUD is responsible for safety, health and environment management aspect. From those three aspects, Pertamina is only responsible for conducting technical guidance and monitoring.

The fulfilment of human resource and social capital

The black market is more profitable

The mining community applied the role of politic economic to deceive Pertamina so that they can gain more profit. It is called “deceiving” since the system run by the miners is without any Pertamina acknowledgement. By using the system, the collected oil will be half delivered to Pertamina while the rest will be individually sold through workers called “rengkek” which will then be sold to the community. Based on the community, their income is not as much as what they earn through self-selling. Therefore, there are cases in the community in which the community try to attract investors to dig new wells and to fund the capital and mining equipment. This effort is made to produce more oil. This activity is prohibited since it is detrimental to the environment and causes excessive exploitation.

Irregular income

To work as miners meant to depend on an unrenovable resource that causes the irregular income for the traditional miners in Wonocolo. This condition is contributed by two factors that are the production result and unstable price of the oil. The volume of oil production each day is unstable, and the price cannot follow the world oil price. Therefore, it can be stated that the miner’s income is minimum due to the high production cost. In addition, sales results to Pertamina which are given every week have to be distributed according to the number of members of the miner group. The miners prefer to sell their oil to “rengkek” (“tengkulak” or middleman) regardless of the refining process they have to do since the price is far higher compared to one from Pertamina. For example, when the produced oil is one drum or averagely 200 litres, it can be sold up to Rp 600,000 to “rengkek”. Meanwhile, if it is sold to Pertamina, the miners will get Rp 1,600,000 for 1 “buk” or averagely 1,000 litres. This means that for 200-litre sales, the miners will get Rp 320,000 from Pertamina. This condition has caused the miners to violate the regulations regardless of the warning they got from the apparatus.

Based on the assessment on the variable considered in fulfilling the human resource and social capital in Wonocolo that consisted of health facilities, education facilities, economic and safety condition in Wonocolo, the community is

categorized as less fulfilled. To fulfil the need in this level, the community needs support from government and Pertamina since the fulfilment on the need of health, education and economic facilities are provided through the government program. Individually, the community does not have the willingness to develop and reach the fulfilment on this level. Meanwhile, in the economic aspect as seen from the miner’s income, they also depend on the world oil price. Therefore, there are some cases in which the miners try to obtain a higher oil price to improve their economic condition.

Happiness fulfilment

Based on the assessment on the variable considered in fulfilling the happiness in Wonocolo that consists of trust and ethic as well as activities in spare time in Wonocolo, the community is categorized as less fulfilled. Viewed from trust and ethics, the community is benefitted from having the sense of togetherness, care and trust built through “manganan or sedekah bumi” as the symbol of their gratitude. “Sedekah bumi” is a regular annual event to gratitude God. This tradition is very sacred and involves almost the entire local people and government. It is a reflection of the people happiness overabundant wealth and needs. Seen from the use of spare time, on the other hand, the community in Wonocolo regarded recreation is being together with family and has some rest at home. They think that activities such as recreation or picnic do not give them benefit and waste their money. Miners do not have time to do so since they have to work every day. They work mostly 24 hours that are divided into shifts according to the schedule. Resting activity at home, gathering with family while watching television is the community entertainment in Wonocolo. Gathering and interacting with neighbours in local shops or terrace is sufficient to relax and to get some rest from work. According to the previous statement, the level of community self-actualization in Wonocolo is fulfilled in two ways. Firstly, it is by using the time at home to take rest (self-quality-time), and secondly, it is by interacting with family at home and neighbours in public space such as local shops, terrace or other regular community events such as “tahlilan/pengajian” (Al Quran recital and preach).

The welfare level of community in Wonocolo

The score calculation was done to each respondent according to the indicator of social welfare. The total score for each variable was used to indicate the fulfilment. The score was then averaged to obtain the level of community fulfilment in Wonocolo, whether it was the ultimate means,

intermediate means, intermediate ends or ultimate ends. From each capital, there was only one capital that was fulfilled that was natural resources. The community in Wonocolo almost fulfil their need in terms of social capital and human resource (intermediate ends) (Table 1). Due to the unfulfilled need in the lower level, the community tend to fulfil their intermediate means. This statement is in line with Maslow hypothesis that human tends to fulfil the basic needs before fulfilling a higher level (Milgram, 1999). This statement is also in line with the score that the level of community welfare in the traditional mining area in Wonocolo in its fulfilment on a natural resource is moving to development capital and

human resource or ultimate means is moving to intermediate means (Figure 1). There is a shift on the role of the politic economic role that is in intermediate means level that moved to intermediate ends. The community in Wonocolo bring the role of politic economic in the ultimate means to intermediate means. According to Meadows (1998), politic economic is contributory to intermediate means level to intermediate ends. Meanwhile, it is different from what is done by the traditional miners in Wonocolo in which the community perform politic economic from the ultimate means to intermediate means. The miners try to obtain maximum benefit from “lantung” production without any permit from Pertamina.

Table 2. The average score of capital fulfilment of welfare level in Wonocolo.

Modal	Score	Percentage	Category	Note
Natural resources	>11	80%	Fulfilled	Fulfilled
	8-11	19%	Less fulfilled	
	<8	1%	Not fulfilled	
Development capital and human resource	>14	4%	Fulfilled	Not fulfilled
	10-14	24%	Less fulfilled	
	<10	71%	Not fulfilled	
Social capital and human resource	>21	49%	Fulfilled	Less fulfilled
	15-21	51%	Less fulfilled	
	<15	0%	Not fulfilled	
Happiness	>10	26%	Fulfilled	Less fulfilled
	7-10	73%	Less fulfilled	
	<7	1%	Not fulfilled	

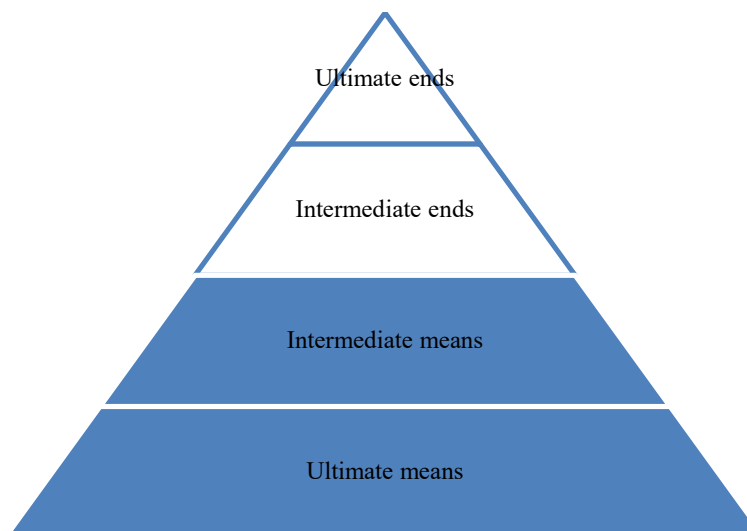


Figure 1. The level of community welfare in the traditional mining area in Wonocolo.

Pertamina acknowledges this practice and gives warning to the miners. Yet, the selling to the black market is still ongoing since the selling price to Pertamina is not satisfying. The fulfilment of

natural resources is vulnerable since natural gas is non-renewable; thus, it is not sustainable. The basic need fulfilment for the miners in Wonocolo is not yet thoroughly fulfilled. There are still some spots

that are vulnerable to clean water shortage, clean air and safety from a natural disaster. Not all community members think they are safe from landslide and fire. It is worsened by degrading water quality and quantity due to the careless disposal of 'lantung'. Community perspective is also still narrow, and they are also insensitive to the surrounding environment, which means that they consider their fulfilment. The sustainability of the need for clean water and air in the mining area is threatened. It is worsened by the use of technology as seen in the change of equipment used from human-powered to machine-powered equipment in the 1980s that is more effective to dig for oil. Unfortunately, the use of a machine with high productivity has run the oil resource out fast. The community is still in the level to fulfil their physiology need which is also categorized as low welfare as seen from Maslow perspective (Milgram, 1999). This can be seen from the absence of community effort to fulfil their safety needs, the need for protection, security, order, law, stability and others. The use of work safety and health device during mining is still limited. This is in line with the perspective of Meadows (1998) that community in Wonocolo is at the level of ultimate means because the community works in a sector that is highly dependent on non-renewable resources. The working system they implemented also depends on muscle, although they are also equipped with a car engine and does not use human energy as much before.

Conclusion

A study on the level of community welfare based on the fulfilment of their needs is needed before implementing the process of development planning. The community in Wonocolo almost fulfil the need of social capital and human resource (intermediate ends), but since the needs in its lower level are not yet fulfilled, the community tend to fulfil the lower hierarchy (intermediate means). The community in Wonocolo bring the politic and economic role in the ultimate means level that is moving to intermediate means. The discussion on the traditional mining community vulnerability is also important in deciding the development strategies. Further research is needed to study more in-depth on the traditional mining community vulnerability in Wonocolo.

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