

# Multidimensional Poverty Measurement of Kotalama Sub-District, Malang City

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**Abstract:** Poverty is one of the main problems in the world that mentions in sustainable development goals. Most countries commonly categorize poverty as a lack of financial resources but this paper aims to examine poverty from a multidimensional point of view. Multidimensional Poverty Index analysis is one method to measuring level poverty in three-dimensional such as education dimension, health dimension, and living standards dimension. Kotalama Sub-district, Kedungkandang District Malang City is selected as a case study in this research. Kotalama Sub-district consist of 11 hamlets wherein at about 174 households are receiver of poverty alleviation assistance. Multidimensional Poverty Index (MPI) analysis shows that Kotalama Sub-district has three levels of MPI such as very low, low, and medium that divided into poor household and non-poor households. The highest value of MPI aggregate is Hamlet 10 (0.18) and the lowest value of MPI aggregate is Hamlet 11 (0.030). The very low MPI value means the hamlet has a low poverty rate and have higher opportunity to increase the level of wellbeing. The highest deprivation value in each hamlet is the education dimension, so to reduce poverty in the Kotalama Sub-district, the government must focus in increase the level of education in the community.

**Keywords:** Poverty, Measurement, Multidimensional

## 1. Introduction

Poverty is a problem that often occurs in the world which is mentioned in SDGs. The definition of poverty can be seen from many points of view, because of that causes poverty not only from economic perspective but also non-economic perspective or multidimensional [1].

Poverty is a multidimensional phenomenon, therefore poverty must be solved with multidimensional approach [2]. All countries must find the causes of poverty, so poverty problems can be solved quickly. To identify level of poverty there are two things that must be determined, such as measurement of living standard, and determine the poverty line. Living standard are multidimensional concept that includes aspects of economic, non-economic and service [3]. Poverty can bring the poor people became low-level of health, lack of education and lack of basic goods [4].

Poverty is main problem many countries in the world especially in Indonesia. Poverty in the developing countries is serious problem that are caused many factors namely 1) lack of access to basic services, 2) governments and non-governmental organizations program are less [5]. Indonesia is one of develop country in Asia that has strategies to increase national income and poverty alleviation [6].

Indonesia poverty reduction that provided by government divided into many aspects such as health, education, basic needs and money. This program/strategy has three focuses consist of implementation of comprehensive social protection, expansion and improvement of public services, and sustainable livelihoods [7]. Poverty alleviation programs or strategies in Indonesia aim to improve people's welfare by reducing regional poverty levels [8]. Mutidimensional Poverty Index is an international poverty measurement by capturing the acute deprivations in health

dimension, education dimension and living standards dimension [9]. The multidimensional poverty index also provides information to the government for policy making, especially poverty alleviation policies that can be seen from the deprivation value in each dimension [7].

Central Bureau of Statistics mention that number of poor people in Indonesia are decrease [10]. The number of poor families or poverty rate in Indonesia reduce because government make many program that focus in poverty alleviation. Poverty alleviation assistance that has been provided by government covering *Beras Miskin* (Raskin – Poor Rice), *Kartu Indonesia Pintar* (KIP – Indonesia Smart Card), *Program Keluarga Harapan* (PKH – Family Hopes Program), *KartuKeluarga Sejahtera* (KKS – Wealth Family Card), and *Kartu Indonesia Sehat* (KIS – Indonesia Health Card) [7].

National Socio-Economic Surveys shows that poor families in Malang City in 2019 decreased compared to 2018. On the other hand there are 4.51% of population (people above 5 years) are not going to school [11]. The number of child mortality in Kedungkandang District (Kedungkandang Health Center, Gribig Health Center and Arjowonangun Health Center) in 2018 was 59 cases [12]. Multidimensional Poverty Index (MPI) measurement on the health dimension that uses two indicators, namely child nutrition and child mortality. The existence of under-five mortality in Kedungkandang District indicates that the standard of living is not fulfilled based on the standard of living of the MPI.

Kotalama sub-district is one of sub-district in Kedungkandang District that has 816 poor households (Poor Rice Program) [11]. Kotalama Subdistrict is one of the poorest sub-district in Malang City [13]. This condition shows that people in Kotalama Sub-district have lack of basic needs. Kotalama Sub-district is one of sub-district that

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has the highest density in Kedungkandang District. The highest density can increase level of poverty or decrease level of wellbeing [14].

This research important because Kotalama Sub-district is one of poorest sub-district in Kedungkandang District. In addition, Kotalama Sub-district has slum area, therefore this analysis is needed to measure how severe poverty in Kotalama Sub-district.

## 2. Method

### 2.1 Data collection and sample

Data collection in this research is divided into primary data and secondary data. Primary data are collected through face-to-face questionnaire survey to head of household on December 2020. Secondary data are collected through literature review from document, journal, article or policy. this research use proporsional stratified random sampling technique . The sample size can be seen in formula below.

$$n = \frac{N}{1 + Ne^2}$$

Details:

n = sample

N = total of household

e = error level (0.05)

$$n = \frac{6156}{1+(6156 \times 0,05^2)} = 375 \text{ household}$$

Using Slovin formula with 5% error of level, number of respondents are 375 households, that the targeted of respondents are households who received Raskin.

**Table 1:** Number of Sample

Hamlet	Sample	Poor sample	Non-poor sample
1	29	4	25
2	39	5	34
3	24	3	21
4	30	4	26
5	15	2	13
6	33	4	29
7	63	8	55
8	46	6	40
9	39	5	34
10	51	7	44
11	8	1	7

**Table 2:** Data Collection through Questionnaire

No	Provisions	
1	Location	Kotalama Sub-district
1	Unit Analysis	Hamlet ( <i>Rukun Warga</i> )
2	Unit sample	Households
3	Sample object	Head of household
5	Time	08.00 AM–03.00 PM
6	Date	December 2021
7	Total of page number	2 pages
8	Duration	10 minutes

According to table 1 show this research divided sample into 2 class consist of poor sample and non-poor sample. The completeness of all sample information in this study carried out with questionnaire data collection.

### 2.2 Multidimensional Poverty Index (MPI)

The multidimensional Poverty Index (MPI) a method that mentions by Alkire and Foster (2007, 2009). Multidimensional Poverty Index (MPI) is a tool used to identify the depth of poverty and how they are poor [15]. Multidimensional Poverty Index (MPI) has a value range between 0 – 100. It consist of 3 dimensions, 10 indicators and deprivation criteria. Dimension of Multidimensional Poverty Index (MPI) namely education dimension, health dimension and standard of living, explained with detail in the following section.

#### a) Education dimension

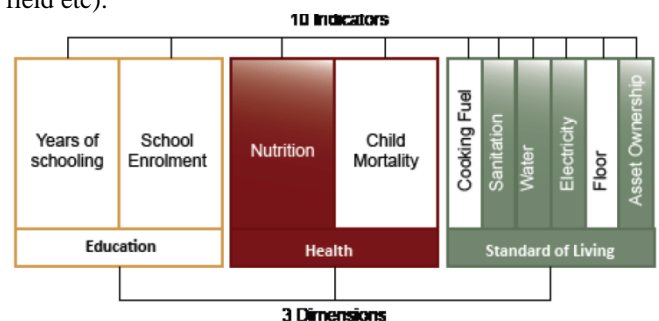
Education dimension has two indicators namely school attainment and attendance of school. The household is deprived in school attainment if there are none of household members that completed the minimum education (12 years of schooling). The household is deprived in attendance of school if any member household (school-age) not attending school.

#### b) Health dimension

Health dimension has two indicators are child mortality and nutrition. The household is deprived of child mortality indicator if any child has died in the family. The household is deprived of nutrition indicator if any member of household has malnourished.

#### c) Standard of Living dimension

Standard of living dimension has six indicators such as cooking fuel, sanitation, water, electricity, floor and asset of ownership. The household is deprived of cooking fuel if they cook with wood, charcoal or kerosene. The household is deprived of sanitation if the household sanitation facility is not good (there is no ventilation, shared toilet, or don't have toilet). The household is deprived of clean water if the household not served by piped water. The household is deprived of electricity if household has no electricity access. The household is deprived of house floor if the household has sand or dirt floor. The household is deprived of asset of ownership if the household dosen't has asset more than one of mobility asset (car, motorcycle etc), information access (radio, TV, handpone etc) or livelihood asset (livestock, field etc).



**Figure 1:** Dimension and Indicator of MPI

Source: OPHI, 2020

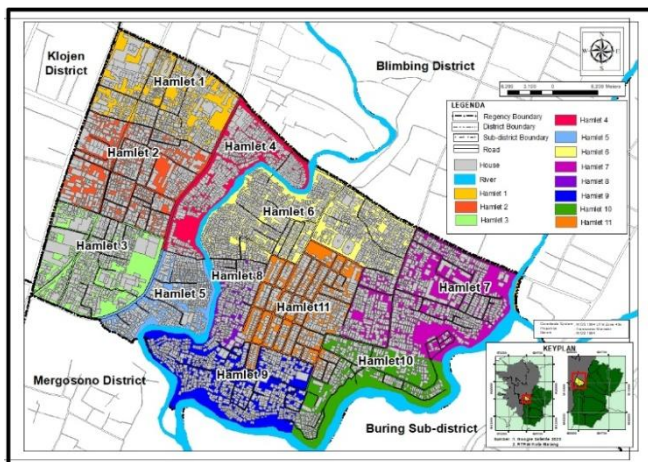
Multidimensional poverty index analysis is carried out with several steps below [16]:

- Determine the unit of analysis, in this research take place in subdistrict.
- Calculate the sample

- c) Dimension and indicators selection
- d) Cutoffs for each Indicator
- e) Determine indicator weights. This paper use each indicator of education dimension 0.1667, each indicator of health dimension 0.1667 and each indicator of standard of living dimension 0.0556
- f) Calculate the Headcount (H) ratio
- g) Calculate the Average of Intensity (A)
- h) Calculate MPI level (MPI=HxA)

**3. Result**

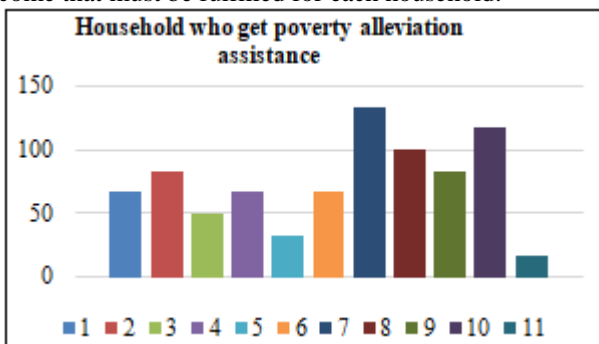
Kotalama Sub-district is one of slum area in Malang City, East Java, Indonesia. Geographically, Kotalama Sub-district is located along the Brantas River. Kotalama Sub-district has 11 hamlets. Kotalama Sub-district is the one of sub-district that has a high density of population. Base on sub-district office data, the total population in Kotalama 2020 are 43,800 people (29,263 male population and 14,537 female population) [17].



**Figure 2:** Kotalama Sub-district Map

Figure 2 shows Kotalama Sub-district map that has 11 hamlets. In the north, Kotalama Sub-district bordered by Blimbing District, south bordered by Mergosono Sub-district, west bordered by Klojen District and the east bordered by Buring Sub-district.

Economic condition in Kotalama Sub-district can be seen from total household who get poverty alleviation assistance, total average income and also total household under poverty line. Poverty line is method to know minimum level of income that must be fulfilled for each household.



**Figure 3:** Chart of Poverty Alleviation Assistance (KeluargaPenerima Harapan)

Figure 3 shows that each hamlet has different number of poverty alleviation assistance. The dark blue color means hamlet 7 has the highest number and hamlet 11 has the lowest number.

**Table 3:** Economic Condition in Kotalama Sub-district

Hamlet	Average income	Households under poverty line
1	Rp2,744,828	21%
2	Rp2,533,333	26%
3	Rp2,637,500	25%
4	Rp2,466,667	23%
5	Rp2,320,000	33%
6	Rp2,390,909	30%
7	Rp2,319,355	34%
8	Rp2,163,043	35%
9	Rp2,225,641	38%
10	Rp2,172,549	51%
11	Rp3,462,500	13%

As show in Table 3, average income and poverty line is variable to know poverty condition in Kotalama sub-district from economi point of view. Hamlet 10 has the highest percentage (51%) of households under poverty line. Its mean 51% of total sample in Hamlet 11 has income under average Malang city income 2019 (Rp.543.966).

**3.1 Multidimensional Poverty Index Measurement**

Multimensional poverty index is tools to identified poverty level not only from economic pint of view but also multidimensional point of view.

**a) Education dimension**

Education dimension has two indicator, the first indicator is school attainment and the second is attadence of school. The number of education dimension in each hamlet can be seen on table 4.

**Table 4:** Education Dimension

Hamlet	Aggregate	Poor	Non-poor
1	88%	85%	93%
2	89%	78%	94%
3	84%	93%	78%
4	85%	80%	83%
5	70%	75%	67%
6	79%	79%	79%
7	86%	86%	86%
8	90%	89%	90%
9	89%	86%	90%
10	88%	96%	87%
11	100%	100%	0%

The education dimension table shows that each sub-district lags behind in the education dimension. Poor households have a higher household deprivation value, which means that the education level of poor households is worse than that of non-poor households. Poor households, a hamlet which has the highest deprivation value is Hamlet 11 (100%). The highest deprivation non-poor household is Hamlet 2 (94%). From secondary survey, most of people in Kotalama Sub-district have an elementary school for minimum education. Higher deprivation rate in education means there are household member who do not participate in education or do not completed the minimum education.

**b) Health dimension**

Health dimension in multidimensional poverty index has two indicators. All indicators child mortality and nutrition has a good value. It means no households are deprived of nutrition indicator and no child has died in the family.

**c) Standard of Living dimension**

Standard of living dimension has six indicators such as cooking fuel, sanitation, water, electricity, floor and asset of ownership. The first indicator that is calculated in standard of living is clean water. Clean water is important thing to basic need. Clean water in Kotalama District are served from PDAM (municipal waterworks) and wells. The second indicator is access to sanitation. Kotalama District is located in watershed (along the river) so many household has a bad sanitation. The third indicator is electricity, from questionnaire there are household that has sharing electricity so they are deprived. The fourth indicator is floor, the household is deprived of house floor if the household has sand or dirt floor. The fifth indicator is cooking fuel, there are no household in Kotalama District are cook with wood, charcoal or kerosene, so all household are not deprived. The last indicator is asset of ownership, all hamlet in Kotalama District has household that are deprived. The number of living standard dimension in each hamlet can be seen on table 5.

**Table 5: Living Standard Dimension**

Hamlet	Aggregate	Poor	Non-poor
1	12%	15%	7%
2	11%	22%	6%
3	16%	7%	22%
4	19%	20%	17%
5	30%	25%	33%
6	21%	21%	21%
7	14%	14%	14%
8	10%	11%	10%
9	11%	14%	10%
10	12%	4%	13%
11	0%	0%	0%

Based on table 5, the dimensions of the living standard are divided into poor, non-poor and aggregate. The higher the deprivation value of the living standard means the household who living with limited basic needs are higher too.

The highest value of living standard in poor households is Hamlet 5(25%) and the lowest value is Hamlet 11. The highest value of living standard in non-poor households is Hamlet 5 (33%) and the lowest value is Hamlet 11 (0%). The Multidimensional Poverty Index (MPI) in each value can be seen in table 6, 7 and 8.

**Table 6: Multidimensional Poverty Index Poor Households**

Hamlet	Headcount	Average of Intensity	MPI	classification
1	0.85	0.39	0.33	High
2	0.53	0.43	0.23	Medium
3	0.78	0.36	0.28	High
4	0.73	0.38	0.28	High
5	1.00	0.37	0.37	High
6	0.53	0.42	0.23	Medium
7	0.62	0.39	0.24	Medium
8	0.65	0.38	0.24	Medium

Hamlet	Headcount	Average of Intensity	MPI	classification
9	0.64	0.39	0.25	Medium
10	0.63	0.35	0.22	Medium
11	1	0.33	0.33	High

As show in table 6, Multidimensional Poverty Index (MPI) in poor households has three classification such as low, medium and high. The highest value of MPI is Hamlet 5 (0.37). Hamlet 11 has high classification (0.33) because in Hamlet 11 only has 1 poor sample. So headcount value is 1 or 100% poor sample are poor.

**Table 7: Multidimensional Poverty Index Poor Households**

Hamlet	Headcount	Average of Intensity	MPI	classification
1	0.08	0.36	0.03	Very Low
2	0.20	0.35	0.07	Very Low
3	0.15	0.43	0.06	Very Low
4	0.23	0.36	0.08	Very Low
5	0.21	0.33	0.07	Very Low
6	0.21	0.39	0.08	Very Low
7	0.10	0.39	0.10	Low
8	0.26	0.37	0.10	Low
9	0.32	0.37	0.12	Low
10	0.46	0.38	0.17	Low
11	0.00	0.00	0.00	Very Low

Base on table 7, Multidimensional Poverty Index (MPI) in non-poor households has two classifications consist of very low and low classification. The highest value of MPI is Hamlet 10 (0.17) and the lowest value of MPI is Hamlet 11 (0). Hamlet 11 has 0 value because Hamlet 11 doesn't have households who deprived.

**Table 8: Multidimensional Poverty Index Aggregate**

Hamlet	Headcount	Average of Intensity	MPI	Classification
1	0,190	0,380	0,070	Very Low
2	0,240	0,370	0,091	Low
3	0,230	0,400	0,090	Low
4	0,300	0,370	0,110	Low
5	0,310	0,350	0,107	Low
6	0,250	0,400	0,101	Low
7	0,310	0,390	0,120	Low
8	0,320	0,370	0,120	Low
9	0,360	0,370	0,130	Low
10	0,480	0,380	0,180	Medium
11	0,080	0,330	0,030	Very Low

As show in table 12, Multidimensional Poverty Index (MPI) in Kotalama District has three classifications such as very low, low and medium. The highest value of MPI is Hamlet 10 (0.18) and the lowest value of MPI is Hamlet 11 (0.030). the very low MPI value means the hamlet has a low poverty rate or most household have a good condition in education, health and asset.



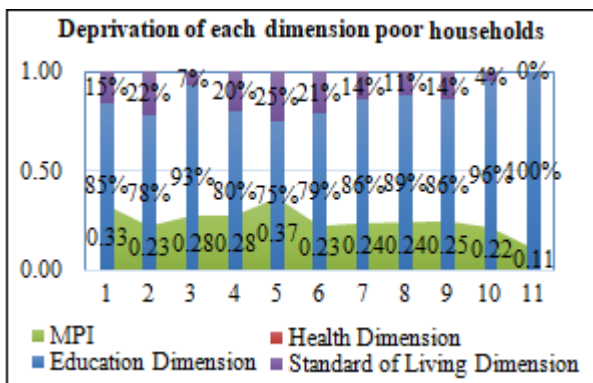


Figure 4: Deprivation Each Dimension Poor Households

Based on the graphic image contribution deprivation in each MPI dimension poor households, it is known that in each RW has the highest deprivation value in the education dimension. The highest deprivation value of the education dimension is in Hamlet 11 100%, which means that all poor households in Hamlet 11 are deprived of the education dimension. While the lowest deprivation value is in RW 05 spread 70% which means 75% of households that mention into the multidimensional poor category are deprived of the education dimension.

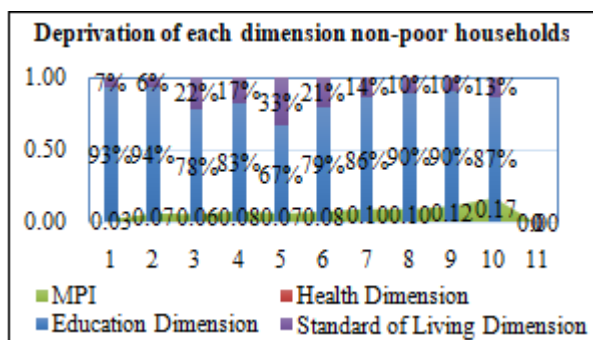


Figure 5: Deprivation Each Dimension Non-poor Households

Based on the figure 5 shows each RW has the highest deprivation value in education dimension. The highest deprivation value of the education dimension is in Hamlet 294%, which means 94% poor households in Hamlet2 are deprived of the education dimension. While the lowest deprivation value is in Hamlet 11 spread 0% which means all household have a good quality of education, health and living standard.

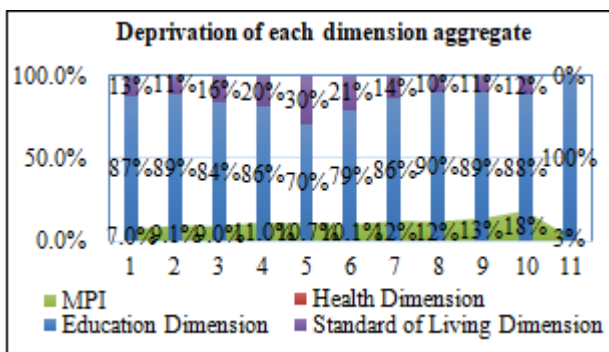


Figure 4: Deprivation Each Dimension Aggregate

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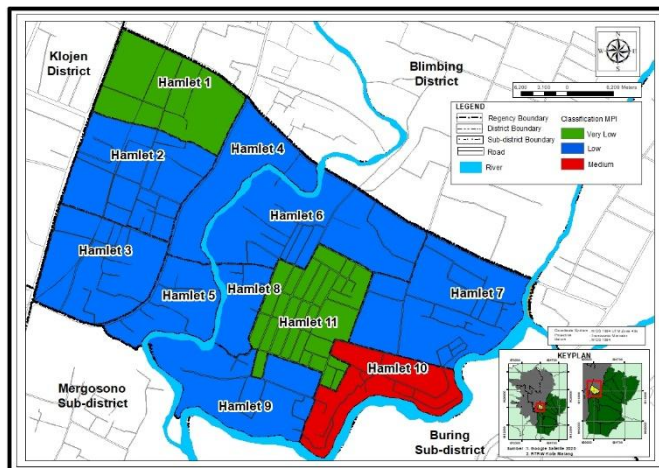


Figure 5: Map of MPI in Kotalama Sub-district

#### 4. Conclusion

MPI is a method or tool for the government to measuring poverty more accurately, it can also be used as a tool for eradicating poverty. Base on the result of MPI in each hamlet for aggregate, the highest value of MPI is Hamlet 10 (0.18) and the lowest value of MPI is Hamlet 11 (0.030). Multidimensional Poverty Index (MPI) in poor households has three classifications such as low, medium and high. The highest value of MPI is Hamlet 5 (0.37) and the lowest value of MPI is Hamlet 11 (0.11). Multidimensional Poverty Index (MPI) in non-poor households has two classifications consist of very low and low classification. The highest value of MPI is Hamlet 10 (0.17) and the lowest value of MPI is Hamlet 11 (0). Hamlet 11 has 0 value because Hamlet 11 doesn't have households who deprived. The most dimension that deprived is education dimension, reducing or alleviating poverty in Kotalama Village can be done with the first priority in the field/dimension of education, the second priority is a decent standard of living and the third priority is public health. Educated families will make an impact to getting out of poverty. Education can increase the individual's skills for decent job. The priority of poverty alleviation in KelurahanKotalama is carried out in the hamlet with the highest poverty index value, namely RW 10 with the category of medium multidimensional poverty.

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